INSTITUTE FOR INFORMATION TECHNOLOGY APPLICATIONS
BLANKET PURCHASE AGREEMENT
FACTOR 1 - CORPORATE CAPABILITY AND QUALITY
BLANKET PURCHASE AGREEMENT (BPA) MASTER MANAGEMENT PLAN (MMP)

RFQ643526
12RT0064

6 February 2012

Prepared for:
Attn: Heidi Sawyer Contracting Officer
heidi.sawyer@gsa.gov

Prepared by:
Jacobs/TYBRIN Group
1030 Titan Court
Fort Walton Beach, FL 32547

Point of Contact:
Sam Revill
850-882-9740
samuel.revill@tybrin.com

TABLE OF CONTENTS

LIST OF FIGURES

BLANKET PURCHASE AGREEMENT (BPA) MASTER MANAGEMENT PLAN (MMP)

1 INTRODUCTION

The United States Air Force Academy (USAFA) Institute for Information Technology Applications (IITA) needs software and geospatial engineering services from a team that can provide them at the highest levels. This team must have knowledge and experience with .NET software engineering, development, and maintenance, and be experts in the production and dissemination of customized Google Earth globe solutions using Google Earth Enterprise and Google Fusion servers. The Jacobs Team—Jacobs Technology's TYBRIN Group (Jacobs/TYBRIN) and our subcontractor, Navagis, LLC—has the capabilities, experience, and expertise to achieve and exceed your requirements.

For nearly 40 years, Jacobs/TYBRIN has provided process-based software engineering, project management, and technical assistance services to the Department of Defense (DoD). We have developed large, enterprise-class .NET software solutions that are deployed across entire Air Force communities of users. We are a premier provider of force-wide mission planning and range management solutions. One of our signature programs, Patriot Excalibur (PEX), is a showcase model for the successful implementation of Agile development methods in DoD. Even now we are successfully applying these skills and experience to your problem domain in developing and maintaining solutions for IITA Warfighters Edge (WEdge).

A true differentiator of the Jacobs Team is our inclusion of Navagis, LLC as our sole subcontractor. Navagis is a ***Google Earth Enterprise Partner and the only company in the world devoted exclusively to installation, training, administration, and custom solutions development using the Google Earth Enterprise***. Navagis is also the only Google Earth Enterprise Partner company to have been ***contracted by Google itself for in-house support and consultation for the development of the next generation of the Google Earth Enterprise***. This highly successful teaming arrangement has already brought great benefit to you in our current work as your Warfighter Geospatial Center (WGC) service provider, a role that Jacobs/TYBRIN and Navagis share and execute as a fully integrated partnership.

TYBRIN Corporation became a wholly-owned subsidiary of Jacobs Technology in 2009 and we are now known as Jacobs Technology's TYBRIN Group (Jacobs/TYBRIN). This proposal is submitted under TYBRIN's IT70 Schedule, GS-35-5923H, which existed prior to the Jacobs acquisition of TYBRIN. As a member of the Jacobs Engineering family of companies, we are part of a global organization with more than 60,000 employees providing world-class engineering services across a widely diverse range of industries. We supply our customers with innovative, Capability Maturity Model Integration (CMMI®)-based solutions. We achieved corporate ISO9001:2008/AS9100 (Aerospace Standard) certification in 2009. The independent ISO 9001 audit of our Engineering and Test Division (ETD), which is where the IITA team will organizationally reside, was cited by the auditors as ***one of the cleanest initial ISO audits ever executed, with zero findings***—a rare occurrence for a first-time ISO 9001 audit. These industry qualifications mean we have been recognized for our ability to deliver high-quality, cost-effective solutions on a reliable and repeatable basis.

The central core of our proposal is proven experience: the services you need are the services we are already providing to you at a very high level of success and customer satisfaction, and have successfully performed for Air Force, DoD, and commercial customers all over the world. We have a deep understanding of your requirements and high confidence that we can satisfy and exceed them on every front, just as we have done and continue to do for you and our other customers. We look forward to continuing our successful partnership with IITA, helping you continue to achieve the levels of success that you and our other customers have come to expect from the Jacobs/TYBRIN team.

As you read our Blanket Purchase Agreement (BPA) Master Management Plan (MMP) in the following pages, our proposed solution references the relevant sections of the Government's performance work statement and the Request for Quotation (RFQ), Section 12, Basis for Selection. Our proposal will describe our Technical Approaches, Policies, and Procedures in Section 2 and our Management Approaches, Policies, and Procedures in Section 3.

2 TECHNICAL APPROACHES, POLICIES, AND PROCEDURES (RFQ 12.3(C), IITA BPA 1.5)

2.1 Performance Category 1: Geospatial Services (IITA BPA 1.5.1)

We have an established team of experienced geospatial engineers and Google Earth Enterprise experts already supporting your Warfighter's Geospatial Center (WGC)─Jacobs/TYBRIN and teammate Navagis, the same team we are proposing for this BPA. During the time we have been on task, we have overcome many obstacles—rapid transition to complete in-progress work, network restructuring, incorporating changing customer requirements, and world-wide hard drive shortages—to produce a world-wide Fusion dataset for the Air Mobility Command Directorate of Intelligence (AMC/A2). We established effective quality and configuration management (CM) plans and procedures as well as weekly status calls and reports with AMC. Our ability to quickly adapt to and respond to customer needs has resulted in a strong working relationship with the customer and with the United States Air Force Academy (USAFA) WGC Program Manager (PM). We will continue to deliver this unique, world-class expertise to IITA under this BPA.

2.1.1 Geospatial Engineering (IITA BPA 1.5.1.1)

Our team possesses exemplary experience and qualifications capable of satisfying your demanding geospatial engineering requirements. We will continue to provide qualified staff with geospatial engineering experience in Google Earth Fusion and Enterprise Server, Google Earth globe production, geographic information systems, and geospatial data source expertise to satisfy the WGC geospatial engineering requirements. Some of our geospatial engineers have very recent Southwest Asia theater combat experience and bring a high degree of operational focus to this area of your mission. Our team members have current and ongoing expertise in source production and data manipulation as well as product and project management. These skills offer a robust capability to manage geospatial data requirements and sources. As we have already demonstrated in our current WGC work, ***the level of expertise with the Google Earth Enterprise that our team is capable of delivering is unlikely to be matched by any other offeror.***

2.1.1.1 Google Earth Qualifications (IITA BPA 1.5.1.1.1)

Our core team of highly qualified Google Earth and geospatial engineering professionals will not change under the BPA. You will continue to receive the same level of knowledgeable experience and expertise on which you have already come to rely.

We have already demonstrated that we can produce Google Earth globes in response to your requirements and those of your customers. In the time we have been on task at the WGC, we delivered two two-dimensional maps for MITRE Corporation, a rapid response globe of Jordan for the 570GMRS/615CRW, and initial publishing of the COCOMv2 globe for AMC/A2 (via remote server access). When we took over this work from the departing incumbent, we found many of the resources and tools required for Google Earth globe production were left in a poorly configured or less than optimal state. Servers were loaded with unsupported operating systems and required rebuild, the Google Fusion asset root was set up incorrectly, and the imagery provided for inclusion in the priority globe was not previously checked for quality (clouds, visibility of features, age, overlapping source, etc.). ***We have successfully overcome these problems and will continue to institute other improvements to maintain a well-functioning and highly capable Google Earth globe production capability in IITA.***

2.1.1.2 Open Source Geospatial Product Qualifications (IITA BPA 1.5.1.1.2)

We understand that use of Open Source platforms such as NASA's World Wind to produce virtual globes for visualization, simulation, and modeling is growing in the geospatial community. Such applications have similarities in design and require a core understanding of virtual globe architecture, an understanding we possess. Production processes are also similar to Fusion, and we understand the data formats and standards that are necessary to support interoperability between platforms. Our team has experience with a vast array of geospatial applications and data formats as well as the need to support interoperability between applications whether proprietary or open source.

Our team's expertise in geospatial data management, interoperability, and production of virtual globes ensures full support of the requirements of various geospatial applications across multiple open source platforms and operating systems. We will provide depth of expertise in multiple programming languages (Java, JavaScript, C, C++, C#, Python) to modify and/or add functionality to any of these products, create appropriate plug-ins, use SDKs, modify user interfaces (UIs) and/or websites, and create Web Mapping Services (WMS) to support virtual globe needs.

2.1.1.3 Distributed Computing Qualifications (IITA BPA 1.5.1.1.3)

We will implement and manage a Google Earth Enterprise (GEE) Fusion Grid system that spans multiple cores in the Defense Engineering and Research (DREN) High Performance Computing (HPC) Centers, as well as the underlying asset root. When dealing with a large grid and asset root, the Fusion graphic user interface (GUI) is not sufficient to properly manage the globe building lifecycle. In these cases, we develop automated tools that utilize the Fusion command line library to keep the process efficient and manageable. Our team has solved such limitations on past programs through development of a process to determine an "expansion ratio" based on source imagery used through the Fusion lifecycle. We will use this same technique to determine your storage requirements for pre-build of the asset root folder directory utilizing symlinks across multiple volumes.

We understand the Linux-based architecture of the system and will work closely with local and outside resources for network and HPC access. We will be trained on setting up and scheduling Portable Batch System (PBS) jobs, optimization of which is necessary to incrementally build the Fusion resources on the HPC. We will write automated scripts for processing and transfer of data, and to optimize the Fusion processing maximum efficiency.

Because of severe bandwidth limitations encountered in transferring source and globe data between IITA and the Maui and Wright-Patterson HPCs, we are building a server appliance and storage array to contain all of the required geospatial source data. Once the build is complete, we will ship the appliance to the Wright-Patterson HPC where the data will be loaded on the computing core. We are also capable of and already performing early planning for setup of a local HPC on-site at USAFA for local processing of source and globe data, which will eliminate the long delays encountered in network transfers to the HPC.

2.1.2 Geospatial Product Management (IITA BPA 1.5.1.2)

We have already established and will continue to maintain and improve a highly effective geospatial product management and globe production process in your WGC. As we continue forward on the IITA BPA, these processes will be subject to ongoing review for continuous process improvement.

We will continue to provide geospatial engineers who are experienced and knowledgeable in geospatial data source acquisition, production, and handling, as well as application of geospatial data in support of military operations. This will enable us to effectively interface with the operational customers such as AMC as well as other DoD customers to determine customized globe requirements. From these requirements, we will establish the baseline for the source imagery, vector, and terrain data and begin the search for source materials.

We will acquire unclassified geospatial imagery, vector, and terrain data through approved Government and commercial channels, including National Geospatial-Intelligence Agency (NGA), military data acquisition units, and commercial entities such as Digital Globe, GeoEye, and EagleVision. We will also coordinate with Google Earth partners for data sharing and exchange. Acquisition of source data will be an ongoing process, since new imagery and data are continuously made available by providers. We will monitor RSS feeds and WMS and Web Coverage Service (WCS) services for such updates, and maintain frequent direct contact with provider points of contact to obtain sources not available through web channels.

We will copy received source data to a central storage server and organize it for efficient access and mapping to the production process. The raw source data may require format conversion to support the production software. In those cases, we will use the commercial off-the-shelf (COTS) Global Mapper application as the primary processing software to export the data to a desired format. Although it is a very

low-cost software application, Global Mapper provides a very powerful set of tools for converting, preprocessing, manipulating, and quality checking the source data before submission to the Google Fusion process, ***resulting in a very favorable cost/benefit ratio in terms of saved time and improved quality of the finished globe***. In addition to Global Mapper, we are also familiar with and will use the Geospatial Data Abstraction Library (GDAL) suite of GIS tools. GDAL is an open source framework of raster data manipulation tools that comes installed with every instance of Google Earth Enterprise Fusion. This suite will give us more ***flexibility for imagery preprocessing as this framework can be run when needed both on the local and remote HPC fusion grid systems***.

We will catalog and manage source data using ESRI ArcGIS, enabling us to search for on-hand source data by multiple attributes such as type, format, currency, quality, source agency, and more, as well as display coverage polygons and views of source data on a base world map to determine adequacy of coverage. From this management system, we will publish the source data locations to the Google Fusion engineer for incorporation into the globe production process. After delivery of the globe product, we will maintain the source data on the central system until newly acquired source is obtained. We will then archive the original source data on hard drives and place the new data on the server. We will record the update in the catalog and publish it to the Google Fusion engineer to ensure any revised or new globes include the new data.

2.1.3 Geospatial Product Delivery and Support (IITA BPA 1.5.1.3)

We will deliver finished Google Earth globes either as portable globe solutions or as complete Google Earth Enterprise solutions. We will deliver portable globes on USB 3.0 portable hard drives that are preloaded with the Google Earth portable globe runtime engine, the portable globe database, and other selected information such as user guides and instructions. We will create the portable globes using a specially automated routine that uses the Google Earth Enterprise cutter command line tools. Prior to creating the portable globe, we will generate a metric to determine if the target portable globe will fall under a desired maximum file size.

For a complete Google Earth Enterprise solution, we will create a turn-key server appliance using appropriate hardware and storage. We will install and secure the operating system (currently Red Hat 5.6) with the necessary libraries, together with the latest Google Earth Enterprise software. We will tailor each appliance based on its respective site Linux domain requirements (hostname, SSL, LDAP, virtual servers, etc.). Before shipping the server, we will use the appropriate publishing mechanism (depending on the size of the requested globe) to load a pre-built globe onto the server.

When we generate updates for globes on servers that are already deployed, we will use our disconnected database tool to generate delta disconnected globes. We will also create and provide a deployment script using the disconnected commands that automatically deploys the disconnected globe on the server with minimal effort from the on-site staff. We will also provide a script that can be run in order to clean the publish root of older unused files.

If sufficient network access is available, we will manage the remote Earth servers from the Master Fusion server. If feasible, we will use Fusion's ability to publish globes over port 80 or via an SSH tunnel if required.

We will provide telephone support to the remote sites. If necessary, we will send a qualified Google Earth Engineer on-site to handle any issues that arise. Our Navagis teaming partner is authorized by Google to deliver customized Google Earth Enterprise training solutions and will be capable of rapidly responding to any request for user assistance.

2.2 Performance Category 2: Software Development and Research (IITA BPA 1.5.2)

Jacobs/TYBRIN has been developing new and expanded software systems for the Air Force and DoD for 40 years. Our expertise in software systems development spans virtually every conceivable application domain to include mission planning systems, flight operations and range management, unmanned aircraft command and control (C2), flight performance models, weapons and sensor telemetry processing,

advanced modeling and simulation, accounting and finance, and personnel management.

2.2.1 Software Development Tasks (IITA BPA 1.5.2.1)

Whether developing new capabilities or expanding existing ones, we apply best practice, proven systems and software engineering processes executed by highly qualified engineering professionals to produce, field, and support systems at exceptional levels of quality. As described in our management features at 3.1.3.4, we are a ***Capability Maturity Model Integrated (CMMI®) Level 3 and ISO9001:AS9100*** company.

Qualifications under these standards provide you with an independent assessment of our ability to deliver quality software products that meet and exceed your expectations. ***But we have taken implementation of these industry-best practices to a new level of innovation by marrying them with Agile methods***. Processes such as those defined under these quality models are often described as "disciplined," which might mistakenly be thought of as too rigid for the type of proof of concept, prototyping, and rapid development envisioned under this BPA. We, however, have successfully integrated Agile approaches—which are ideally suited for these types of activities—together with these two process models. ***This successful integration will provide IITA with the best of both worlds: a software engineering capability that is agile and responsive to your unique requirements, but one that is not chaotic, undefined, and ultimately uncontrolled***.

We have already begun that integration process at WEdge with our undertaking of the WEdgeNET File Replication and WEdgeViewer applications and will continue as our activities on those tasks progress. The validity of this integration approach can be demonstrated where we have successfully executed it on other projects where critical safety of flight issues are at stake, such as the development of safe escape solutions for the F-35 Joint Strike Fighter (JSF) program. Indeed, Ms. Linda Crabtree, our proposed IITA BPA Program Manager (PM), came to IITA WEdge from leading our Joint Safe Escape Analysis Solutions (JSEAS) team where she instigated the successful adoption of Agile principles and incorporated them into the stringent engineering and design methods required by this program. Her vision and leadership in that regard were ***key to successful recovery of that project's schedule and resulted in the JSEAS office becoming the only element within the entire F-35 JSF weapon system program to be considered on time***.

In conjunction with these highly successful software development approaches, we bring a wealth of experience and knowledge designing and implementing systems under the .NET framework. We are a Microsoft® Certified Gold Partner. As such, enterprise development with the full range of Microsoft® development platforms and languages is a deeply embedded core competency. All of our software engineering past performance references for this task order include large, complex, thick client, web, and Service Oriented Architecture (SOA) applications developed with C#.NET (PEX, mission planning, IITA WEdge) and VB.NET (Central Scheduling Enterprise) in a Team Foundation Server (TFS) environment.

We already have a highly skilled team of Microsoft developers at IITA WEdge that is fully integrated into the WEdge Agile environment, has successfully solved particularly difficult software engineering and analysis problems in picking up and executing the WEdgeNET and WEdgeViewer projects with minimal documentation, and has developed very positive and productive working relationships with the Government's WEdge program office as well as other contractor companies working in IITA WEdge. That core of in-place expertise eliminates any risk of program and schedule disruption that often occurs when a contract change-over occurs. Beginning with the very first task order call, we can draw upon that continuity of knowledge and expertise to quickly stand up and orient new staff and initiate the work in a timely manner without delay.

TYBRIN's ETD, which will execute all work under this BPA, has an additional 70+ highly skilled .NET software engineers on staff, including those assigned to our very successful Agile showcase program, Patriot Excalibur (PEX), which is more fully described in 2.5.1 Agile Programming Methodology and in our past performance citations. This store of expertise provides all of our BPA task order teams with a tremendous source of reachback capability to a tremendous wealth of expertise. This

expertise is not limited only to Microsoft's .NET and TFS tools, but includes the methods and approaches that have proven so successful and which we have now brought to and will continue to apply at IITA.

2.2.2 Software Development Services (IITA BPA 1.5.2.2)

As part of our ongoing work at IITA WEdge, we have already demonstrated that our team possesses the knowledge and skill to accomplish the new and expanded development work envisioned under this BPA. The WEdgeNET File Replication Service and WEdgeViewer both involve developing new or expanding capabilities ***using Microsoft® .NET and TFS platforms and require virtually every skill set called for under this Performance Work Statement (PWS*) *requirement***. For example, both projects involved significant research and analysis, creation of software architectures, development of new code, software testing, disciplined CM, application of team quality assurance (QA) practices, use of specialized frameworks such as Windows Communication Foundation (WCF), geospatial features integration, UI design, interfaces with external programs, and SOA.

We will continue to apply our skills and knowledge with these tools to develop and field new IITA programs, leveraging the expertise we have developed on our current IITA WEdge projects as well as on the great multitude of other enterprise-class .NET software engineering projects and practices currently underway both in ETD and in our Advanced Systems Division (ASD), the home of our many mission planning software engineering programs.

We will provide secure access to Warfighter applications developed on the BPA through our expertise with implementation of the Public Key Infrastructure (PKI) by binding public keys with the users' respective identities by means of a certificate authority (CA). We will be able to produce and modify databases to include spatial databases and geospatial designs. Using WCF, we will provide SOAP-based extensible, interoperable, reliable software on the best platforms for each task (WSE, ASMX, remote, COM+ or MSMQ). With WCF, we have the expertise to provide a service once, and then expose it on multiple endpoints as in the WEdgeNET broker and service provider host. We will produce a rich Windows smart client UI using Windows Presentation Foundation (WPF) that is effective, usable, and understandable. Through WPF we will add enhancements in quality, performance, and capability with the graphics support, as well as a separation between the UI and the business logic that will allow for better maintainability in the future when the logic/interfaces may change.

2.3 Performance Category 3: Software Maintenance and Modification (IITA BPA 1.5.3)

2.3.1 Software Maintenance Tasks (IITA BPA 1.5.3.1)

We routinely develop and maintain existing code, both our own as well as code created by other developers. We support and maintain software systems that are globally distributed to many thousands of Warfighters—such as our mission planning solutions and PEX operations management system—using update methods and distribution chains designed to minimize impacts on the users and eliminate any risk of breaking working software in the field.

We employ multiple methods of identifying and soliciting maintenance requirements such as dedicated help desks, formal requirements review boards, user conferences, system support web portals such as Mission Planning Central (MPC), and regular email and phone dialogs with users in the field. We also have subject matter experts (SMEs), typically former aircrew members, who evaluate these systems and relay recommendations for modifications to the software engineering teams.

We also have extensive experience transforming existing legacy systems into loosely coupled, SOA-enabled applications. Both our PEX and Center Scheduling Enterprise (CSE) systems have undergone such transformations during their respective life cycles.

2.3.1.1 Modifying Existing Code Bases

In identifying and categorizing maintenance requirements of existing code bases, we will classify each prospective modification in one or more of the following categories.

- **Adaptive**—Such changes modify the software to adapt to environmental or regulatory changes,

such as an upgrade of the operating system, new security requirements, change in hardware, or a change in the networking environment

- **Perfective**—Such changes modify the software to improve existing or add new system functions
- **Corrective**—Such changes modify the software to correct flaws such as erroneous computational results, non-compliance with applicable standards, or unstable operation
- **Preventive**—Such changes modify the software to eliminate latent faults that have not yet affected system operation

Comprehending existing code—particularly legacy code from other developers that is not sufficiently documented and commented—is the single greatest impediment to the software maintenance task. A relatively simple change requiring literally minutes to implement in code may require many hours of code examination to locate and determine possible impacts of the change to other portions of the system.

To facilitate this comprehension, we will make use of static and dynamic code analyzers. Such analyzers can examine both the non-running source code (static) and the executing object code (dynamic) and present to the examiner a wealth of information to ***reduce by orders of magnitude the time necessary to fully comprehend the code***. Examples of information available through this automated analysis include:

- Names and interface descriptions of all modules in the system
- Reverse-engineered class diagrams
- Procedural call trees that show all possible call sequences from one procedure to the next
- All execution paths through a procedure as the result of branching functions such as if-then, do-while, and select case statements, included auto-generated flow charts
- Declaration and use of all internal variables
- Identification of suspect code practices such as global variables, use of “GOTO” statements, implicitly defined variables, and unreleased memory
- Calculation of code complexity metrics
- Extraction of all comments
- Logging of changes in system state and variable values during system execution
- Time of execution in individual procedures

We will advise and assist IITA in selecting and establishing a system for tracking and prioritizing maintenance and modification requests and, where feasible, incorporate these maintenance and modification actions into our Agile processes as described in section 2.5.1.

As we visit and analyze existing applications for maintenance, we will extend our analysis beyond the immediate issue identified in the maintenance/modification request and determine what additional modifications to recommend for improving future maintainability on the system. These may include but are not limited to insertion of comments, refactoring of functions, decoupling of modules, simplification of complex routines, improvement in naming conventions and variable usage, and more. We will identify such prospective changes to the IITA program manager, along with impact of their adoption on completion of the maintenance/modification request, for approval and inclusion in the requirement.

2.3.1.2 Transformation to Service Oriented Architectures

The task of transforming an existing software application into a loosely-coupled SOA design presents numerous challenges and difficulties, ***challenges that Jacobs/TYBRIN has encountered and successfully overcome on multiple occasions***. Legacy code will typically be monolithic in character, that is, no clear distinction in the code or architecture to clearly separate those parts of the application that perform distinctly different categories of functions such as data storage, retrieval, and updates; manipulation of data or calculation of results based on business rules and processes; and presentation of data to the end user in a form that can be readily and efficiently understood and with which the user can interact.

Transformation of such a legacy application into a loosely coupled SOA-based architecture will require analysis and design considerations on multiple levels. We will carry out the following activities in executing such a transformation:

- We will analyze the existing code base to identify and separate the various application concerns into distinct and separate architectural elements, and decouple them from each other. This will typically require the application to be separated into at least three architectural layers: presentation services, business logic services, and data storage services
- We will determine what to expose through the SOA interface. While the presentation services have no role to play here, the transformed application may expose business logic services, data storage services, or some combination of the two to external actors and systems
- We will analyze the structure and content of stored data to determine its suitability for consumption in an SOA-enabled environment. Transport of application data in the form of eXtensible Markup Language (XML) or JavaScript Object Notation (JSON)—two widely used data syntaxes for SOA applications—may require significant remodeling and additional normalization of the underlying application database
- We will identify the external actors and interfaces—both current and future—that may need to interact with the system. Some external systems currently interacting with the system under transformation are not likely to be in a state to consume an SOA-based interface in the same timeframe as others, if ever, requiring continued maintenance of legacy interfaces for a period of time
- We will determine the impact of the transformation with regards to enterprise and network services such as transaction control, authentication, and permissions enforcement. While fairly simple features to implement in a monolithic application that operates on a local area network, these issues become infinitely more complex when they must operate over a widely dispersed network where issues of network latency, availability, and synchronicity come in to play
- We will consider the challenges of discovery. One of the core concepts of an SOA approach is that applications offering such services can be independently discovered and consumed by external systems without the need of lengthy technical interchanges by human actors and hard-coded interfaces. In order for the transformed application to be consumed in this way, its functions and interfaces must be published through a standards-based mechanism such as Web Services Description Language (WSDL) files and Universal Description, Discovery and Integration (UDDI) services

2.3.2 Software Maintenance Services (IITA BPA 1.5.3.2)

Industry studies show that, historically, the cost of maintenance is 50%-80% of the total life cycle cost of a software product. Therefore, a service provider must be as qualified and experienced with maintenance tasks as they are with development, if not more so. It also indicates that reducing maintenance costs should be a core strategy for reducing the system's total cost of ownership.

We initiate these maintenance cost reductions by considering issues of maintainability in the early requirements and design phases of any new code we develop. Not only does our Agile methodology, as described in section 2.5.1, lead to a higher level of functional correctness with respect to requirements, but it also ensures that significantly fewer undetected defects find their way into released code. We couple that with design and engineering practices that are proven to make the task of downstream maintenance of a released product considerably easier and, thus, less expensive. These include:

- Loosely coupled, modular design
- Granular modules that perform a single function with minimum code complexity
- Consistent naming conventions and code formatting
- Disciplined use of informative comments that can be automatically extracted into documentation
- Disciplined CM, version control, and change history

As previously noted, comprehending preexisting code for the purpose of maintenance can involve significant research and analysis where such issues of maintainability are not taken into early consideration. ***As part of our ongoing work at IITA WEdge, we have already demonstrated that our team possesses the knowledge and skill to accomplish this type of maintenance work***. Our success in reconstituting WEdgeNET and taking up continued development of the WEdgeViewer involved the application of virtually every skill set required under this PWS requirement. For example, both projects involved significant analysis of existing code and architectures, modification and correction of existing code, integration of new capabilities into existing code, bringing existing code under disciplined CM, application of team QA practices, use of specialized frameworks such as WCF, geospatial features integration, UI design, interfaces with external programs, and SOA.

As we continue to work with these for WEdge, and on future maintenance tasks for other IITA projects, we take on significant responsibility for product quality from that point on. Therefore, not only the correctness of the maintenance change, but also the future maintainability of the code being modified, is of paramount importance to us. Our skilled software engineers will apply these disciplines, skills, and engineering principles to address the maintenance issue at hand and will ***always return the modified code to the product baseline in a more maintainable state than that in which we found it.***

2.4 Performance Category 4: Information Technology Support (IITA BPA 1.5.4)

2.4.1 Server and Desktop Support

We are recognized throughout DoD as a top-tier quality provider of engineering and technical services, including information technology (IT) support. To secure your systems, all server configurations will be backed up weekly with emergency repair disks and reloadable disk images will be available for quick Operating Systems/application/print and file service restores. To ensure data availability and integrity, we will support all current IITA backup and disaster recovery capabilities as well as research and recommend new or enhanced capabilities where appropriate. We are highly qualified on all types of disaster recovery and restoration mechanisms from simple tape-based backups to high levels of fault tolerance and backup solutions with systems such as COMMVault and EMC Celerra storage solutions, mirrored server and drive implementations, clustering, and backup solutions such as disk-to-disk, off-site, and cold-warm site solutions.

"Jacobs Technology continued to provide first-rate information technology support across their diverse customer base. Displaying all essential aspects in managing a technically complex and administratively challenging contract, Jacobs clearly has shown their ability to provide top technical expertise, sound leadership, financial conservatism, problem resolution, impressive safety record, customer-first attitude, and employee oriented culture…Overall, the quality of services and products exceeds customer expectations. A high degree of proficiency and thoroughness of effort was evident throughout all completed work." – ITSS 09/10 CPAR

Where applicable and desired, we will use Virtual Machines for quick restore of servers, enhanced fault tolerance, and quick mission capability recovery. No changes will be made to systems unless authorized and approved. No software will be loaded on servers unless it has a valid license, is on the Air Force-Evaluated/Approved Products list (AF E/APL), or has undergone a certification and accreditation (C&A) and has been added to the Host Base Enclave C&A package. We will ensure all software licensing agreements are adhered to and provide software inventory accountability according to AFI 33-114. The security posture of servers we manage will be assessed and hardened via Defense Information Systems Agency (DISA) Gold Disk, eEye Retina, or equivalent scanning tool to ensure compliance with the DISA Security Technical Implementation Guides (STIGs) and applicable AFIs. We will conduct periodic checks of system logs, drive space availability, bandwidth activity, and other key indicators of network trends and malicious activity. We fully understand what to look for and how to report anomalies, which will be clearly spelled out as part of our daily job functions.

We have extensive experience with Microsoft® Active Directory for management of network accounts

and group permissions. We will develop documented procedures for ensuring proper rights assignment via security groups within the enterprise, ensuring accountability and making certain that the security concept of least privilege is applied. We also have extensive experience working with automated patch management systems such as System Center Configuration Manager (SCCM) to track patches on Standard Desktop Configuration (SDC) systems. We currently ***support thousands of desktops and laptops on NIPRNET, SIPRNET, and other classified networks***.

Where IITA has requirements for support of the Air Force Standard Desktop, we understand the update and upgrade requirements and downward-directed pressure that is applied as upgrades are mandated. To keep SDC systems current with mandates, such as upcoming/ongoing Windows 7 requirements, we use a variety of available tools and techniques such as "Run Advertised Programs," network pushes, Windows Deployment Server, and wipe and reloads, as needed. We also use automated tools to ensure no loss of data within user profiles. We currently support thousands of NIPRNET and SIPRNET workstations. We have a very high success rate on compliance by implementing attainable goals and milestones for rollout and deployment that allow us to meet the 100% compliant suspense date. This same process will be used for patch management and software upgrade mandates.

We also understand that as a research and academic institution, IITA may employ nonstandard configurations and mixed platform environments. Our experience with highly specialized networks and computing enclaves supporting advanced research and development activities on mixed Windows, Linux, and Apple Mac platforms enables us to carry out all of your potentially unique and non-standard IT support requirements.

2.4.2 Network Infrastructure

We bring a vast body of knowledge and experience to bear on the IITA BPA IT Support requirements. While responsibility for much of the network infrastructure will lie with the host Air Base Wing, our extensive experience monitoring, controlling, and supporting large, installation-wide networks, such as Eglin Air Force Base, and secure computing enclaves supporting 1,000+ geographically dispersed users, means that we possess all of the tools, techniques, and capabilities needed to support IITA requirements.

We have supported networks consisting of over 700 network switches and routers and approximately 22,000 end user devices. We use standard vendor tools such as Cisco Works and HP Openview to monitor the network and to trap and report out-of-threshold performance. We consolidate performance data into daily utilization/performance reports and analyze to support recommendations for upgrades and configuration changes. We have developed detailed troubleshooting guides and procedures, and conduct training for DoD personnel on all aspects of network operations and maintenance. These procedures have been time-tested and refined over nearly two decades of experience in Air Force networking environments, resulting in the ability to rapidly respond to and correct system problems.

For the Eglin network, TYBRIN developed detailed network topology maps that display all network devices, type, model, location, IP address, host name, VLAN/Trunk assignment, physical uplink port assignments, installed modules, cable type (single/multi-mode fiber, twisted pair), cable distance, configured line speed, and supported customer contact information. Our system security engineers and information assurance (IA) test teams executed the Independent Validation and Verification (IV&V) of the Eglin Combat Information Transport System (CITS) Block 30 Spiral 1. These tests involved validation of configuration on multiple CITS security components such as Host Intrusion Detection Servers (HIDS), Vulnerability Scanners Servers, Windows Certification Servers, Windows Update Servers, Security Information Management database servers, AFNOC Domain Controllers, Central Logging System Servers, and authoritative Domain Name Service servers.

We also perform rapid setup of ad hoc networks for support of specialized events such as conferences and workshops where network and Internet access must be provided for guest users, many of whom bring in unknown equipment for connection to the infrastructure. This includes installation, configuration, and security monitoring of wireless access points, both inside the base firewall perimeter as well as in the demilitarized zone.

2.4.3 IT Configuration Management

While frequently applied in a software development context, CM is a vital discipline in maintaining a safe, secure, reliable, and available IT infrastructure. While an employee may leave, taking knowledge with him or her, disciplined, documented processes and procedures that govern the IT environment remain.

CM is often left as an afterthought to be performed when time permits, but we understand that it is a core competency that must be given high priority. Even the IITA BPA PWS allocates a specific CM requirement only to the "All Software Tasks" body of requirements (IITA BPA 1.5.5.6).

We will help IITA establish an effective and reliable CM system that is also applied to the IT support environment that consists of the following features and activities:

- **Identification**: Locates and identifies all items to come under configuration control, gives them a name, a version identification, and unique configuration identification
- **Control**: Policies and processes to manage and control change requests and the application of those changes to items under configuration control
- **Status Accounting**: Record and report the status of configuration items and change requests
- **Configuration Audit/Review**: Inspection of items under configuration control to verify that their current state agrees with the recorded configuration

2.4.4 Innovative Solutions

We have extensive experience designing, building, and maintaining innovative infrastructures to provide customers with the ability to implement unique requirements and to achieve higher levels of availability, fault tolerance, and program savings. For example, ***we can apply proven virtualization best practices to meet service-level agreements, maintain consistency among server configurations, save money, and rapidly deploy new systems*** to meet requirements as they arise. We are also highly proficient in various thin client implementations such as Trusted Computer Solutions thin client platform. In one implementation, we are supporting 290 thin client networks in multiple security domains. This configuration enhances system security and greatly streamlines our ability to provide a consistent, easily maintained, properly configured, and fully patched desktop experience to our users. Rather than maintaining dozens of individual personal computers, the thin client configuration is maintained on a single platform. A new, modified, upgraded, or patched client environment is served up to the user each time he or she accesses the system without the requirement to physically maintain the individual personal computers. As IITA requirements and mission needs dictate, we are fully capable of bringing our experience with IT innovation to bear on your task order requirements.

"TYBRIN network engineers led a 'Green IT' initiative with server virtualization and thin client technologies that resulted in $120,000 in savings through energy savings and reduced server hardware costs." – SES FY10 CPAR

2.5 All Software Tasks (IITA BPA 1.5.5)

2.5.1 Agile Programming Methodology (IITA BPA 1.5.5.1)

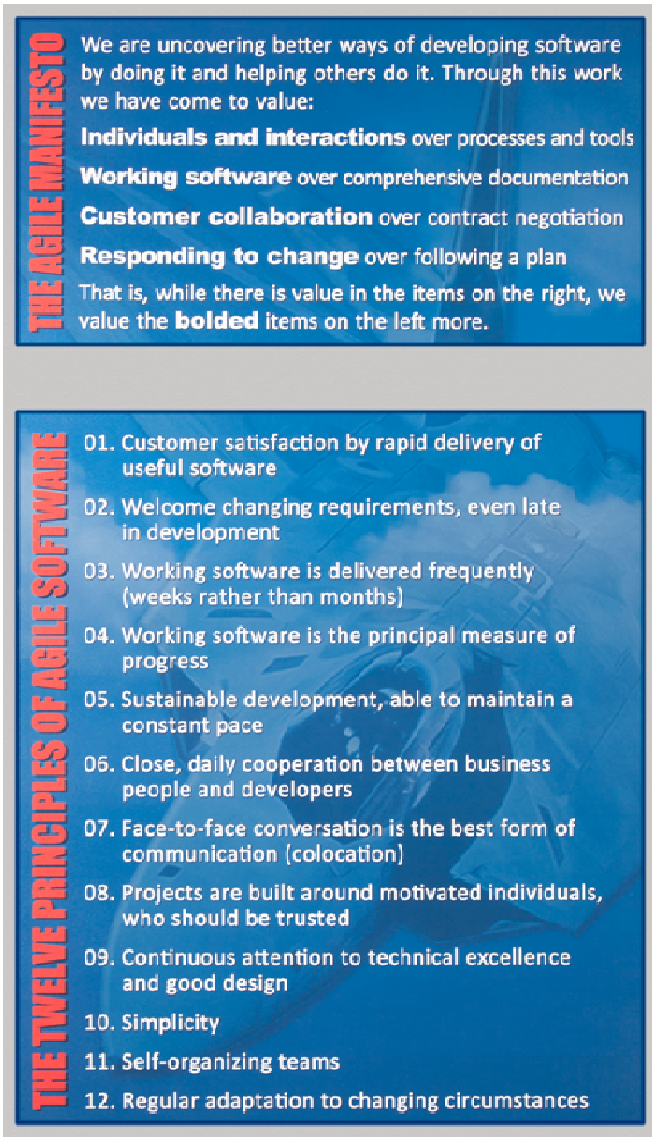
In 2003, a full seven years before Congress mandated a transformation in DoD information technology (IT) acquisition that describes several key features of an Agile process (see reference to Section 804, The National Defense Authorization Act for Fiscal Year 2010), ***our PEX development team was already working on the leading edge of this transformation*** to adopt and implement the set of values and practices that we now

"The Secretary of Defense shall develop and implement a new acquisition process for information technology systems. The acquisition process…shall…be designed to include: A) early and continual involvement by the user; B) multiple, rapidly executed increments of releases of capability; C) early, successive prototyping to support an evolutionary approach."— Section 804, The National Defense Authorization Act for Fiscal Year 2010

recognize as the Agile development method. This transformation and the resulting dramatic improvement in software quality, user acceptance, and approval were so complete that our ***PEX project was recognized as one of DoD's Top 5 Quality Software projects*** (Crosstalk, The Journal of Defense Software Engineering, July 2004, Vol. 17, No. 7). In 2008, our PEX team was a ***finalist for the Air Force Chief of Staff Team Excellence award***. That success continues to this day, with the PEX team and software widely recognized throughout multiple Air Force and DoD corridors as a best-in-class model for how software should be developed and delivered using Agile methods. Our team members regularly appear at DoD, Air Force, and industry forums and conferences as speakers, panel members, and Agile advocates to share with others the successes and lessons of their on-going journey. ***PEX is also the subject of a soon-to-be-released 50-page case study by Carnegie Mellon's Software Engineering Institute (SEI)*** entitled "Case Study of Successful Use of Agile Methods in DoD: Patriot Excalibur." Not only have we properly and successfully executed Agile methodology, our implementation of Agile on PEX is a model for how to do it right to achieve DoD development goals and objectives.

Our ETD, which executes the PEX program, will execute task orders on the IITA BPA. We have already enacted many of these principles at IITA WEdge and will continue that process under the IITA BPA.

Figure 2-1. Our PEX Team Sees and Lives the Agile Manifesto and Principles Every Day



2.5.1.1 Agile Commitment

Any system development model, including Agile, requires a set of defined processes to ensure consistency and control. However, simply having a written set of processes is not sufficient to bring about success. Adoption of various practices often associated with Agile methods—such as pairing or eXtreme programming (XP) or a de-emphasis on extensive documentation—may be noted as evidence of an Agile process; in reality, though, they may simply be proxies for an immature or ineffective development effort.

The key lesson of our many years of successful experience with the Agile method—experience we have already brought and will continue to deliver to IITA—is that while process and practice are important, even more important is a ***deeply rooted commitment at the individual and leadership levels to the core principles that underlie this approach***. We keep these principles constantly in the forefront of our thinking, as figure 2-1 shows. Our team leaders work diligently and effectively to drive these principles into the consciousness of our team, resulting in their unequivocal adoption and exemplary execution.

One of the best practices we have adopted at PEX is to "post work visibly" by incorporating video monitors throughout the PEX facility that automatically displays and

updates the status of all PEX work items at any time. This best practice ***aids in communication, develops a sense of team ownership of the work, and draws constant attention to the effort at hand***. We will work with IITA to explore available methods to bring this level of visibility to software engineering work executed under the IITA BPA.

We have already brought this commitment and thought leadership to WEdge in our current task goals. Moreover, ***we will continue to help the IITA Program Management Office (PMO) infuse your current Agile process with the same energy and direction***. We are uniquely qualified to provide this "go beyond" assistance.

We reviewed the WEdge Scrum Process (Version 1.0, January 13, 2010), then used it as a baseline to bring the in-depth, practical experience needed to further define and improve the process. We overlaid that process with the team internalization and leadership of Agile principles that enable the Agile process to obtain greater levels of software product quality, timeliness, and user acceptance.

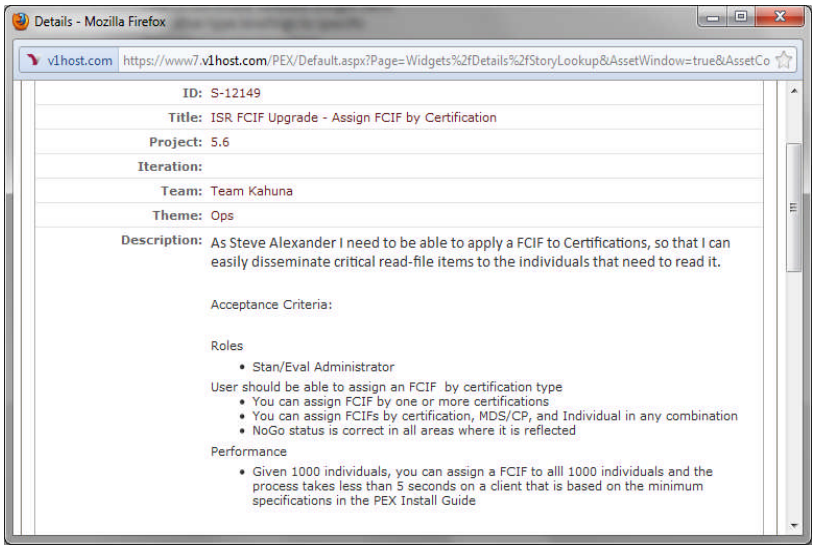
While process particulars are secondary to commitment to principles, we describe in the next section some of the typical Agile activities we carried out on the WEdge task order and PEX program and will continue to implement on BPA tasks. We also illustrate how they intersect with the Agile Manifesto and Principles.

2.5.1.2 Agile Principles in Action

Requirements fluidity is one of the realities recognized by our Agile method. This is a major factor in the IITA development environment where much of the programming activity is either proof of concept or prototype in nature and seeks to develop solutions for operational and technical environments that are not yet fully defined. Our committed Agile mindset fully embraces this fluidity ***(Agile Principle - Welcome changing requirements, even late in development)***.

Our basis for the Agile requirements process is the "story," a high-level, plain-language description of a desired software function or requirement. Most importantly, it comes from the customer or operational user. It is short and represents a useful piece of the software application ***(Agile Principle – Simplicity)***. We originate our stories from multiple sources such as existing documents, Government/user communication (e.g., minutes of user and technical meetings), or as the result of decomposition of larger stories, known as Epics (see figure 2-2).

Figure 2-2. We Capture Agile "Stories" in Team Collaboration Tools



We decompose stories iteratively into successively smaller stories until each individual story can be accomplished in a single iteration. Our development cycle consists of two-week iterations packaged into version releases every 12 weeks that would be demonstrable to the customer. ***(Agile Principles – Customer satisfaction by rapid delivery of useful software; Working software is delivered frequently [weeks rather than months])***.

We conduct our iterative decomposition in close, daily contact and conversation with the user community ***(Agile Principles – Close, daily co-operation between business people and developers; Face-to-face conversation is the best form of communication)***. Stories are prioritized in relation to other

stories in the development queue, or Product Backlog. We facilitate this on-going prioritization process throughout the software's lifecycle by putting ideas, suggestions, new requirements, and more into the Product Backlog, This backlog will undergo reprioritization multiple times before being accepted into a development iteration or release ***(Agile Principle – Regular adaptation to changing circumstances)***.

Our stories are associated with a Condition of Satisfaction (COS) that is created at iteration planning prior to the story being coded in software, creating a test-driven development environment. An Acceptance Test is created in TFS that tests the COS during the iteration and prior to closeout. In addition, the developer creates in-line unit testing using MS Unit Test. The testing must provide at least 80% code coverage. The unit tests are run with each build at the end of the iteration and each successive iteration, providing excellent regression testing of the code. In this way, testing is not an afterthought or a separate activity that only occurs after development is complete. Rather, it is a fully integrated set of activities that ensures test robustness and requirements correctness and satisfaction as fully understood by all ***(Agile Principle – Continuous attention to technical excellence and good design)***.

The iteration is the core activity in the Agile process during which we conduct the iterative development and test of deliverable functions. We precede each iteration with an iteration planning session during which the stories, selected based on priority from the Backlog, are reviewed by the team for understanding and estimation. This is a collaborative process between the customer and the developer to ensure acceptance and commitment to completion of the items included in the iteration ***(Agile Value – Customer collaboration over contract negotiation)***. We conduct a daily standup where members of the team report on what they specifically accomplished yesterday, what they will accomplish today, and identify obstacles to completion ***(Agile Value – Individuals and interactions over processes and tools)***. The task lead takes action to clear the obstacles. We conduct a closeout at the end of each iteration where the work accomplished is reviewed and issues that may have impeded progress are addressed. We then initiate a new iteration and continue this iterative process until all planned iterations for a version release are completed. We conduct a risk meeting along with a Lessons Learned session every month to review accomplishments, issues that may have impeded progress, and to consider improvements to the process.

While the quarterly release is the primary target of our cycle, a defining characteristic of the iteration is that the software is brought to a "potentially deliverable state" at the conclusion of each iteration. This enables us to conduct frequent and on-going product demonstrations to the Product Owner to verify system design, functionality, correctness, and progress ***(Agile Principle/Value – Working software is the principle measure of progress; Working software over comprehensive documentation)***.

Once the product demonstration is approved for a completed release package, we provide support in pre-release activities such as facilitating additional user acceptance testing and reviewing test results and user feedback for inclusion in a future release cycle.

We have put our extensive experience and unqualified success with these principles and values into the WEdge development team efforts and processes. We know from experience that ***the rate of defects in fielded software drops dramatically, and the quality and timeliness of software release increase significantly***, when these principles are fully embraced, understood, and faithfully applied by a talented and motivated team led by mentors and leaders fully committed to them. We bring this commitment and leadership to IITA.

2.5.2 Installer Code Writing (IITA BPA 1.5.5.2)

All of our .NET product teams create installers to deliver software installation and product updates to field organizations all over the world. For our PEX and mission planning software organizations, these installations and updates are routinely delivered to global users via CD shipments or downloads from the respective product support web sites, such as the MPC portal. Together, they distribute nearly 4,500 installer packages per year. The volume of installer distribution, coupled with the importance of the operational mission software they deliver, requires that our installers be designed, coded, and tested with the same care and precision as the underlying software products themselves. Our IITA team will ***thoroughly test and verify installers in the development and test environment under conditions that***

match the production environment as closely as possible within the Government's computing environment. Our testing procedures will verify that the installer identifies and corrects any situation where required files or services are missing.

2.5.3 Software Testing (IITA BPA 1.5.5.3)

We are a premier provider of world-class software test and evaluation (T&E) services to the Air Force and DoD, performing ***formal test support for the 46th Test Squadron (46TS) on over 70 Air Force and DoD mission planning, C2, and datalink systems***. This includes theater-level force management systems such as Theater Battle Management System (TMBCS) and the Air Operations Center Weapon System (AOC-WS). This also includes IA and security testing of these systems. Our testing plans and procedures are extensive, integrating multiple testing techniques and tools.

The Agile processes we bring to IITA also include a tightly integrated test-driven development approach that incorporates test planning and execution in every step of the development process, designing and creating test cases before the first line of code is ever written. We write unit and regression test cases and scripts in parallel with the code they cover. We incorporate execution of the test scripts into the daily build process for automatic execution with every build cycle.

Our IITA team will draw upon the extensive expertise and experience of our PEX Agile development and mission planning/C2 test and evaluation teams to create a Test and Evaluation Master Plan (TEMP). This will integrate industry-best T&E practices into the IITA development cycle, to include functional and non-functional testing, scenario-based testing, compatibility testing with the standard Air Force desktop, automated testing, and white, black, and grey box testing.

2.5.4 Software Security, Certification and Accreditation (IITA BPA 1.5.5.4)

Software security is always a significant focus. Early, rigorous, and continuous attention to security helps our teams ensure that our products meet security target requirements and the DoDI 8500.2 Information Assurance controls, and that these products can be certified and accredited in accordance with (IAW) the DoD Information Assurance Certification and Accreditation Process (DIACAP). Our team has ***extensive knowledge and experience developing and executing DIACAP C&A packages for mission planning and netcentric capabilities***. We are the Information Assurance Officer (IAO) and Information Assurance Manager (IAM) for the Air Armament Center Armament Directorate network, which is a highly specialized enclave of local and wide area networks (both unclassified and highly classified), multiple inline cryptographic devices, advanced virtualization and thin client implementations, and multiple security domains. We also perform all IA actions and prepare all C&A packages for the Air Force SEEK EAGLE Office (AFSEO) IT environment, which is an engineering, research, and modeling and simulation environment consisting of multiple platforms (Windows, Linux, and Apple), use of DREN HPC, and operation of local HPC resources. We also lead the security and IA T&E of multiple Air Force and DoD C2, mission planning, and datalink systems.

2.5.4.1 DoD Information Assurance Policies (IITA BPA 1.5.5.4.1)

2.5.4.1.1 DoDD 8570.1 Information Assurance Training, Certification, and Workforce Management

All DoDD 8570.1 training and certification requirements for each Jacobs/TYBRIN employee are documented and established within our company-wide Learning Management System (LMS). Our training monitor maintains continuity on due dates and completion status of all training, the completion and award of all certifications, and registration and completion of certification continuing education requirements. Supervisors also receive automated reports on due date and completion status of training and certification requirements for subordinates, and can also access LMS at any time to verify current training and certification status.

All members of the IITA workforce will be 100% compliant with all DoDD 8570.1 training and certification IAW specific task order requirements.

2.5.4.1.2 DoDD 8500.01 Information Assurance

In accordance with the requirements of DoDD 8500.01, for each task order project undertaken on the BPA we will:

- Identify IA requirements in the design, installation, operation, and upgrade of the system
- Ensure the appropriate level of confidentiality, integrity, authentication, non-repudiation, and availability that balances system sensitivity, threats and vulnerabilities, trustworthiness of users and interconnection systems, impact of impairment or destruction of the system, and cost effectiveness
- Assist IITA in determining the Mission Assurance Category (MAC) of the system, which is a vital step that defines and drives many of the IA actions and decisions affecting the system
  - MAC I—Systems handling information determined to be vital to operational readiness and mission effectiveness of deployed and contingency forces. Loss of system integrity or availability could include the immediate and sustained loss of mission effectiveness
  - MAC II—Systems handling information important to the support of deployed and contingency forces. Loss can be tolerated for very short periods and may cause delay or degradation of important support services that seriously impact mission effectiveness
  - MAC III—Systems handling information that is necessary for the conduct of day-to-day business, but does not materially affect support to deployed and contingency forces. Loss can be tolerated or overcome without significant impact on mission effectiveness and may cause delay or degradation of routine activities
- Use PKI certificates and biometrics for authentication where possible and feasible

2.5.4.1.3 DoDD 8500.02 Information Assurance Implementation

Based on the MAC determined IAW with DoDD 8500.01, we will identify the required IA controls for integrity and availability as defined in DoDD 8500.02 for each MAC. We will address in the written task order project plan how these will be incorporated into the system design and architecture. These IA controls will fall into any one or more of the following categories:

- Security Design and Configuration
- Identification and Authentication
- Enclave and Computing Environment
- Enclave Boundary Defense
- Physical and Environmental
- Personnel
- Continuity
- Vulnerability and Incident Management

2.5.4.1.4 DoDD 8510.01 DoD Information Assurance Certification and Accreditation Process

We will assist and support IITA in the creation, maintenance, and submission of all documents and artifacts necessary for compliance with DoDD 8510.01 DIACAP requirements. These include:

- System Identification Profile
- Supporting Certification Documentation (e.g., system validation results, description of IA controls)
- DIACAP Scorecard
- IT Security Plan of Action and Milestones

We are also highly experienced with automation and management of the C&A process through the Enterprise Information and Technology Data Repository (EITDR) and Enterprise Mission Assurance Support Service (eMASS) systems. We will apply our experience and knowledge of these systems to assist IITA in execution of C&A activities.

2.5.4.2 Software Reviews and Scans (IITA BPA 1.5.5.4.2)

2.5.4.2.1 Code Reviews (IITA BPA 1.5.5.4.2.1)

Periodic code reviews are a recognized industry best practice, which we routinely implement as part of our CMMI and ISO9001 software engineering and QA processes. We have instituted these as part of our present work at IITA WEdge, and we will continue to execute them for task orders on the BPA.

2.5.4.2.2 Fortify Scans (IITA BPA 1.5.5.4.2.2)

We will use Fortify for scanning source code for known security vulnerabilities as prescribed by the IITA PMO (to include testing and code check-in work flows).

2.5.4.2.3 Software Vulnerability (IITA BPA 1.5.5.4.2.3)

In addition to meeting the Government's minimum metric of zero high and zero critical vulnerabilities, we will conduct an ongoing statistical and root cause analysis of all detected vulnerabilities for feedback into our software QA, software engineering, and peer review practices. We will use this statistical analysis to ***progressively reduce the level of detected vulnerabilities*** through a continuous improvement focus.

2.5.4.2.4 Standard Technical Implementation Guides (STIG) Reviews (IITA BPA 1.5.5.4.2.4)

The architecture and design of software and information systems involve the coordinated integration of many varied components and services, each with its own unique requirements for security. Any reasonably capable software system, especially one designed to operate in a distributed enterprise environment, will incorporate most, if not all, of the following components:

- Client-side application code
- Server-side application code on database, web, and application services servers
- Relational database management systems
- Web servers
- Web browsers
- Proprietary platform frameworks such as .Net and Java 2 Platform Enterprise Edition (J2EE)
- Network services and protocols

DISA has published multiple STIGs that specify the required and recommended security configurations, procedures, and design considerations that govern all of these application components and more. These include (versions are those latest currently posted online at DISA):

- Application Security and Development STIG Version 3, Release 4, October 31, 2011
- General Desktop Application STIG Version 4, Release 1, December 3, 2009
- Internet Explorer 8 STIG, Version 1, Release 5, April 29, 2011
- SQL Server 2005 Database Security Checklist, Version 8, Release 1.7, August 27, 2010
- IIS 7 STIG, Version 1, Release 1
- Application Services STIG, Version 1, Release 1, January 17, 2006
- Microsoft® .NET Framework Security Checklist, Version 1, Release 2.3, February 18, 2009

Design and delivery of secure software systems requires more than a cursory review of these voluminous and complex documents. As part of our project planning procedures for specific task orders, we will perform an analysis of the task order requirements against these applicable STIGs. We will specifically identify in the written project plan those STIG requirements that apply to the project and our approach for incorporating compliance into the project activities.

2.5.4.2.4.1 STIG Publishing and Dissemination

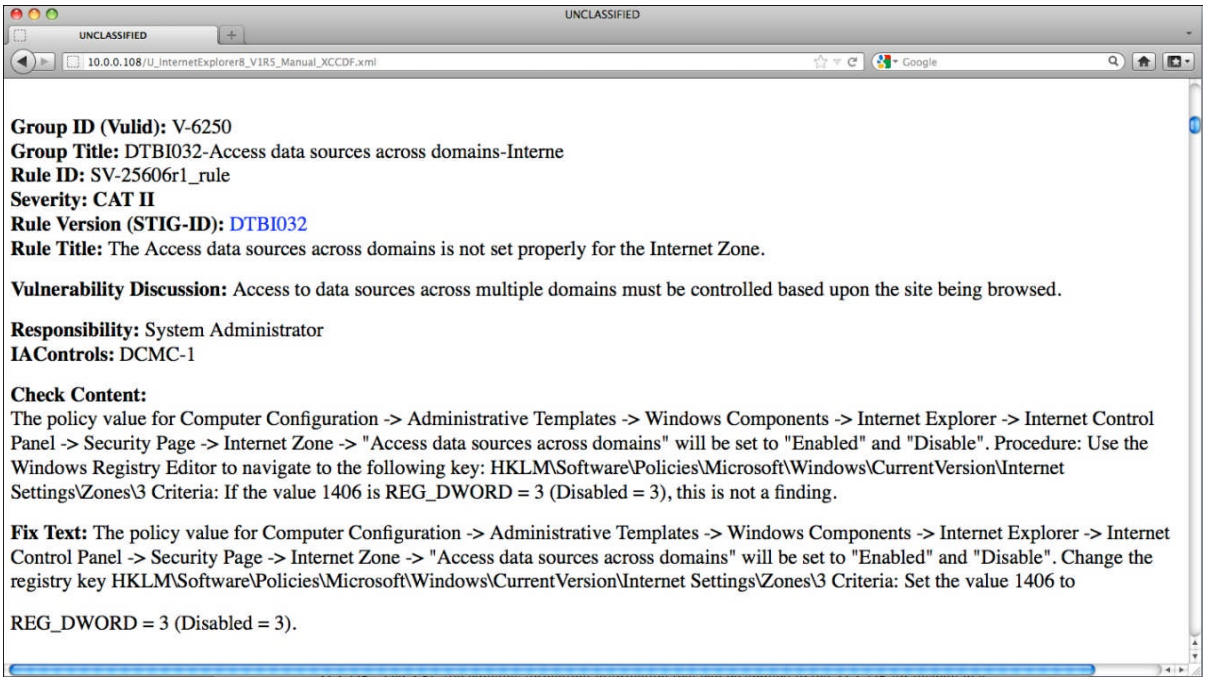
Of particular note, in 2010 DISA began a transition away from traditional documents (e.g., MS Word, Adobe Acrobat) as the medium for publication of the STIGs. Although many existing versions are still available in this form, new STIGs and revisions of existing STIGs are now being published in a machine-

readable format, the eXtensible Configuration Checklist Description Format (XCCDF). XCCDF is an eXtensible Markup Language (XML) syntax that uses standards-based, computer-readable, unformatted text files to convey STIG guidance and information in place of the formatted narrative documents published to date.

The advantage of this form of distribution is that automated assessment and vulnerability analysis tools can read the STIGs and check the system under inspection for compliance. The disadvantage to human consumers is that even though the STIG information is carried in text that is human-readable, that text has been stripped of all formatting and section/paragraph layout information. A STIG in this form would be virtually impossible for a human consumer to read, understand, refer to, and apply in a consistent and timely manner. This limitation will become increasingly pertinent as the performance period of the BPA advances and more XCCDF-based STIGs are released.

To meet the requirement of annual and periodic STIG reviews, these newer STIGs must be reconstituted into a form that the application developer will find comprehensible and usable. To facilitate this reconstitution, DISA also publishes an eXtensible Stylesheet Language (XSL) transformation file for XCCDF. The XSL file contains formatting information that can be applied to the XCCDF for display in a web browser, for example, specifying that information contained between <title></title> tags be centered, bold, Times New Roman, 24-point, etc. Figure 2-3 depicts an XCCDF-based STIG that has had the XSL applied to it for display in a web browser. This transforms the unformatted XCCDF into a form that is much easier for a human reader to consume.

Figure 2-3. XCCDF-Based STIG for Internet Explorer 8 With XSL Applied for Display in Web Browser



There are also commercial and freeware XCCDF readers and translators that can read in an XCCDF text file and present the information to the user in a human-friendly form.

As part of our BPA process, we will take the following additional actions to facilitate the required STIG reviews:

- Establish a STIG repository on either a Government or company-owned server
- Periodically review available STIG versions and releases at DISA
- Download document- and XCCDF-based STIGS to the STIG repository, along with accompanying

XSL transformation files

- Verify XCCDF-based STIGs are readable and transformable via the XSL transformation file
- Make modifications to the XSL transformation as needed to reformat XCCDF-based STIGs IAW local requirements and preferences

2.5.4.3 Service Provider Network (IITA BPA 1.5.5.4.3)

We routinely develop software systems for the Air Force using company-provided networks and computers. These networks and computers are usually located outside of the base network perimeter firewall but are allowed access to the Government's network through virtual private networks to facilitate information sharing with the Government. We also have company-owned computing equipment connected directly to the Government's network inside the base perimeter firewall.

All such systems are configured and maintained in full compliance with DoD IA requirements and incorporate the same security safeguards and procedures as Government networks. We will provide similarly compliant systems for those task orders that require use of a service provider network.

2.5.5 Software Development Qualifications (IITA BPA 1.5.5.5)

2.5.5.1 Certified Ethical Hacker or Equivalent (IITA BPA 1.5.5.5.1)

Our first option in meeting the Certified Ethical Hacker (CEH) requirement will be to hire staff that already possess this certification. In those cases where existing or highly desired prospective staff do not have the CEH certification, we will provide the necessary training and testing either through our in-house TYBRIN Company College (TCC) or through a dedicated classroom boot camp session.

The TCC, our online learning resource that provides over 5,000 technical and management courses, offers a Certified Ethical Hacker curriculum that is officially approved and recognized by the International Council of E-Commerce Consultants (EC-Council), the governing body that establishes the criteria for and awards the Certified Ethical Hacker certification. The course catalog also includes test preparation and mentoring. TCC courses are available to all Jacobs/TYBRIN employees at no cost. Further, these courses can be completed at any time consistent with the employee's schedule and time commitments. TCC gives us ***a streamlined capability to rapidly train and certify our team members with zero impact or cost to IITA***. Rather than pull a team member out for a lengthy boot camp, as is often done, our team members can ***complete the 13-session TCC CEH course while remaining fully available and committed to IITA daily mission needs***.

Even with the advantages of the TCC-provided training, it is often more advantageous to employ a concentrated boot camp-type approach. This provides a much more concentrated learning experience to a collaborative, mutually reinforcing group of people, together with the opportunity to engage in in-depth dialog with an industry expert. Based on task order timing and the number of people to be certified, we can also schedule and provide dedicated classroom CEH certification training and test preparation.

All Jacobs/TYBRIN software development personnel will complete the CEH curriculum and certification test within three months of contract start and/or hire date.

2.5.5.2 Team Foundation Server (IITA BPA 1.5.5.5.2)

Enterprise development using the Microsoft .NET framework and TFS for large team project management and code control is a ***core competency*** at Jacobs/TYBRIN. We use these environments daily to manage numerous large software engineering projects for the Government, delivering complex software solutions to Air Force user communities on a global basis. We are already successfully integrated into the IITA WEdge TFS environment and have adapted the project templates for our Agile approach.

The 40+ developers who comprise our PEX team ***collaborate on this showcase program via a centralized TFS*** configured to support our Agile methodology, control the entire development lifecycle, provide version control and change conflict resolution, and conduct automated builds and automated unit and regression testing. In addition to the developers in our local facility, we also incorporate geographically separated and remote teams from other PEX contractor partners in the PEX TFS

infrastructure.

Likewise, our ASD uses TFS for code control and CM of enterprise mission planning tools and environments that are used across the entire operational Air Force. Our CSE team uses TFS to develop complex web-enabled scheduling and resource management tools for all Air Force test and training ranges.

We will continue to evaluate the IITA TFS implementation and practices, drawing upon the deep experience and knowledge of our enterprise development teams, to ***recommend processes and best practices*** to improve the life cycle activities and CM capabilities of the IITA TFS environment.

2.5.6 Configuration Management (IITA BPA 1.5.5.6)

We have extensive experience maintaining CM of our code bases and other artifacts utilizing TFS. For all development and maintenance efforts, we establish, implement, and maintain a comprehensive CM program. Our team employs mature processes to ensure strict control of all project assets (software, documentation, test artifacts, etc.). CM processes ensure the integrity of all work products and customer deliverables. Solid CM practices provide detailed accountability and reproducibility of each release IAW with strict compliance standards and quality engineering practices. Through work item tracking and other mechanisms, ***we maintain a tight link between requirements, changes requests, bugs, tasks, and software versions/baselines***.

Our approach has historically standardized around the use of development, main, and production subsets within the CM archive supplemented with developer "shelving" as necessary. The seamless integration of TFS with the Visual Studio (VS) Integrated Development Environment (IDE) makes for an easy-to-learn and easy-to-use system that we have leveraged in the production of numerous software solutions.

We will utilize the TFS instance provided by the IITA PMO and will comply with all rules regarding code check-in (to include pre-check-in automated test suites or other criteria) as specified by the Government. In addition, we are fully capable of complying with any standards regarding check-in policies related to your Agile-based TFS process templates. This will properly enable automated movement of work items through the prescribed stages or work streams.

Finally, we will comply with all IITA PMO guidance regarding versioning standards. We will also comply with the CM of non-coded assets through, for example, the use of TFS/SharePoint®-based project portals. This will ensure that all project work products are properly maintained, versioned, and available to project stakeholders.

3 MANAGEMENT APPROACHES, POLICIES, AND PROCEDURES (RFQ 12.3(C))

3.1 All Tasks (IITA BPA 1.5.6)

3.1.1 Interaction with IITA (IITA BPA 1.5.6.1)

Interacting as part of a Government/contractor integrated product team (IPT), including those involving multiple contractors, is the normal method of operation in the overwhelming majority of our service locations. We have major service teams at Eglin Air Force Base (AFB), FL, Edwards AFB, CA, Hanscom AFB, MA, Nellis AFB, NV, Creech AFB, NV, Wright-Patterson AFB, OH, and China Lake Naval Air Station, CA. We have an additional 300+ personnel located in small teams at ~130 locations worldwide. In every case, our teams and team leaders are directly embedded with a supported Government customer, providing quality service and interacting and collaborating with Government and contractor partners in a highly effective and professional manner to ensure product delivery and requirements compliance. We hire quality personnel and empower and trust our IPT leaders to effectively manage all aspects of the project, including technical, schedule, and cost. Our PM and task leaders will interface directly with the IITA PMO and other Government personnel and contractors to facilitate task order execution.

3.1.1.1 Technical Task Leaders

We will identify a technical task leader for each task awarded under the BPA. Each task leader will:

- Function as the senior technical expert in his or her particular domain
- Interact directly with the IITA PMO for technical direction and tasking
- Report project technical status to the IITA project management office as required
- Provide technical guidance, direction, oversight, and mentorship to the task order personnel working within his or her respective task areas

3.1.1.2 Program Manager

One of our technical task leaders, Ms. Linda Crabtree, will also serve as the overall BPA PM. The PM is primarily a technical member of the task order staff, with contract management tasks representing an adjunct commitment to this individual's daily technical work load. The PM will:

- Monitor overall contract funding and manage and report on funding burn rates, expenses, travel, and Other Direct Costs (ODCs) against the timeline and funding for each task on a monthly basis
- Manage workplace issues for task order staff relative to employer/employee relations such as time and attendance, corporate training, and advice/assistance with benefits
- Ensure timely delivery and quality of all task order deliverables
- Manage the prime/subcontractor relationship between Jacobs/TYBRIN and subcontractor Navagis
- Respond as the prime contractor's point of contact (POC) to any Government concern relating to contract performance when such concerns cannot be resolved through the Technical Task Leaders

3.1.2 Customer Interaction & Operational Support (IITA BPA 1.5.6.2)

Close and professional interaction with our customers as part of an embedded IPT is our normal mode of operation. We will document and communicate all customer input from the field. We recruit and hire quality personnel who are evaluated in the hiring process not only for their technical resumes, but also for the interpersonal and communication skills that will enable them to represent Jacobs/TYBRIN with the highest degree of effectiveness, courtesy, and professionalism. Our IITA task order PM will immediately address and correct any departure from the expected levels of decorum, up to termination for any staff member who exhibits an inability to conduct themselves in an appropriate manner. Our PM will issue written guidance to our task order team communicating the expectations and limitations on interactions with cadets. As noted in section 3.1.1.1, the IITA PMO will interact directly with the technical task leaders for tasking and monitoring of production technical requirements and quality.

Creation and maintenance of ***written records and lessons learned are a daily and routine part of our ISO9001:2008/AS9100-certified quality assurance practices***. We will apply those practices throughout our activities as part of the IITA BPA.

3.1.3 Project Management (IITA BPA 1.5.6.3)

We have the ability to effectively manage the execution of all tasks anticipated to be awarded under the BPA. Our program management approach provides the following features and benefits.

3.1.3.1 Stellar Industry Reputation

Jacobs is #4 on Forbes Magazine's 2010 list of "World's Most Trustworthy Companies" for large-cap companies

3.1.3.2 High Quality Recruiting and Retention

Our industry reputation, coupled with highly competitive benefits and compensation, makes us one of the most desirable companies in the world for which to work. We hire and retain the best and have a ***worldwide turnover rate of only 5.9%*** (average 2007-2010).

3.1.3.3 Exceptional and Unified Leadership

Our designated Program Manager, Ms. Linda Crabtree, is a ***senior member of our respective corporate staff.*** She is a long-term employee with 14 years of service to the company, all as a senior project manager. She is one of our most highly respected and accomplished software engineers and project leaders. In addition to her considerable technical and management skills, ***Ms. Crabtree is also the visionary leader and chief architect who planned and led our industry-acclaimed implementation of***

Agile development on the PEX program, and successfully turned around the JSEAS program using a similar approach.

She has served as the WEdge Program Manager since we were awarded the work in 2011 and successfully navigated the program through a very difficult transition in which no incumbent employees were retained and in the face of great resistance and non-cooperation from the losing incumbent. The ability of her team of all new hires to pick up and continue executing the WEdge and WGC mission is a testament to her energy, commitment, and experience.

The continued assignment of Ms. Crabtree to this program signals ***an extraordinarily high level of corporate commitment and management support*** to the success of your task order objectives. Ms. Crabtree will report directly to our ETD Director, Mr. Sam Revill. Mr. Revill has over 40 years of Government service in technical and engineering management positions of increasing responsibility. He will have full senior management authority to address any and all issues and resource requirements relative to your task order, including subcontractor management and performance.

3.1.3.4 Proven Quality Processes

Jacobs/TYBRIN was built on quality. That quality posture begins with our Organizational Set of Standard Processes (OSSP). The OSSP, rooted in CMMI® engineering processes, provides a disciplined, defined framework in which the IITA PM and team can initiate, plan, execute, and deliver products and services of the highest quality within exceptional cost and schedule thresholds. ETD—which executes both the WEdge and PEX program and will execute task orders on the IITA BPA—has been independently appraised as a CMMI® Maturity Level 3 organization. Our showcase PEX program was evaluated as part of that appraisal, conclusively demonstrating that when executed correctly, ***Agile methods are fully consistent with the process maturity and discipline envisioned under the CMMI® model.***

We are an ISO 9001/AS9100-certified provider and have a dedicated corporate staff to support quality on every task. Our quality processes used to support IITA are supplemented by our Quality Management System (QMS). The QMS provides the formal documentation of our QA and management system for establishing and maintaining a consistent quality approach. The QMS does the following:

- Establishes the basic requirements that govern QA and quality management
- Provides guidance for objective evaluation of processes, work products, and services
- Provides staff and management with methods and procedures to obtain objective insight to the processes used on each task and audits all tasks for compliance

We perform audits for each phase of the project life cycle as well as yearly audits of the quality program as a whole. Our quality processes form the framework for delivering quality products.

Our OSSP includes a CMMI® Level 3- and ISO9001/AS9100-compliant “Compliance and Control” process. Project-level QA will inspect work processes and products to verify that they are being executed and produced IAW the processes agreed to by the Government. The PM will initiate a Corrective Action Plan (CAP) that includes recommended actions, milestones, and assignment of responsibilities for anything that is found to be non-compliant. The PM will monitor and report on the progress of all CAP actions to close out and will include a report of all QA audits and CAP actions in the status reporting to the Government.

In our distributed management approach, each PM is given the tools, authority, and responsibility to assign a QA professional to perform inspections on project artifacts as dictated by the contract. The processes and products required for performing CMMI® Level 3 QA activities, including inspections, are provided in our OSSP and are available to the PM and QA professional via our SharePoint® portal on a 24/7 basis. This ensures that the PM receives the results and corrective actions from any inspection in a timely manner and, so, is in a position to quickly address these results prior to delivery to the customer. This ensures that deliverables to the customer meet quality standards of completeness, accuracy, and timeliness.

3.1.3.5 Continuous Investment in Employee Quality

Our employees have unlimited access to over 5,000 technical and professional development courses through our LMS and TCC. Our LMS allows our managers to track and manage all aspects of employee training, qualifications, and certifications. We also provide a generous tuition reimbursement program for both undergraduate and graduate education that is directly related to or enhances the employee's technical specialty. For more information on LMS and TCC, please see section 2.5.4.1 and section 2.5.5.1, respectively.

3.1.3.6 Distributed Work Force Management

The TYBRIN Enterprise Information Management System (TEIMS) is our SharePoint®-based, web-accessible enterprise portal that provides our globally disbursed employees and managers with 24/7 access to 350+ corporate processes and information resources. Any resource or assistance an employee or manager needs to effectively function as part of your task order team can be accessed through TEIMS, saving time and energy that can be better devoted to task execution.

3.1.3.7 Focus On Employee Safety and Well Being

BeyondZero® is our cornerstone roadmap to workplace and personal safety. We consider employee safety a moral imperative. All Jacobs/TYBRIN employees are immersed in our safety culture beginning on their first day of employment. We recognize that an employee who sustains an injury, whether on or off the job, is an employee who is not on the job performing your mission the next day.

3.1.3.8 Global Reachback

Our ability for Global Reachback provides us with maximum agility and flexibility to respond to IITA BPA task order requirements, regardless of the complexity or estimated duration of a particular task order. In addition to access to over 175,000 resumes and dedicated recruiters to identify and hire new regular full-time and part-time staff, we can bring to bear the following additional resources and approaches:

- **Intersegment Working Agreement (IWA)**—Every Jacobs project can reach across our global enterprise to engage additional needed resources. In a single year, Jacobs professionals provided over 300,000 hours or 163 man-years of just-in-time, tailored expertise to other segments through our IWA process
- **Alumni Association**—The Alumni Association maintains contact with former employees who enjoy a high level of confidence and receive information about new business developments, contract wins, company organizational changes, and opportunities for re-employment within the company
- **Reserve Corps**—The Reserve Corps is a valued group of semi-retired and retired personnel with critical knowledge of programs, projects, and technologies upon whom we draw to satisfy peak demands and unique skill requirements in supporting programs for our customers. The Reserve Corps provides an important dimension of flexibility and outstanding technical capability in meeting customer requirements. Assignments are typically intermittent and short-term

3.1.3.9 Tailored Program Management (IITA BPA 1.5.6.3.1)

The very first project initiation step in our CMMI® Level 3- and ISO9001/AS9100-compliant organizational processes is the development of a tailored management plan. Included as a key element in our OSSP is a mandatory tailoring process, which applies not only to the development of the program and project plan, but also to all other engineering and business management processes that will be employed within the project. Under this tailoring approach, every key process in the OSSP is broken down into a number of action steps, and each of these action steps is further described with a tailoring attribute that indicates whether that particular step is mandatory or optional and if tailoring is allowed, required, or optional.

3.1.3.10 Metrics (IITA BPA 1.5.6.3.2)

Virtually all of our enterprise-level project teams use advanced project management tools such as Microsoft Project to depict and manage project progress. They work with their respective customers to identify, collect, and analyze project metrics across multiple project attributes such as milestone completion, critical path performance, work package progress, financial performance, labor effort, product complexity, product quality, and process effectiveness. Many of our more complex T&E tasks include three dozen or more metrics, which include red/yellow/green and change indicators. Our on-site PM and technical task leaders will work with the IITA PMO to set up and execute task order project tracking in Microsoft® Project and TFS, as well as definition and delivery of project metrics for each task order awarded under the BPA.

3.1.3.11 Integrated Digital Environment (IDE) (IITA BPA 1.5.6.3.3)

Project coordination, communication, and artifact access and control via SharePoint® are a core Jacobs/TYBRIN competency. Our own company enterprise portal is built on SharePoint® technologies and is used across our entire organization for the control, dissemination, and coordination of all administrative, technical, financial, and management activities.

We have also implemented SharePoint® solutions for customers, incorporating numerous custom-built capabilities that greatly extend SharePoint® out-of-the-box features. For example, the MPC portal, built and maintained by Jacobs/TYBRIN under the Mission Planning Support Contract (MPSC) at Hill AFB, provides a central communication point, download repository, and shared workspace for thousands of globally dispersed mission planning software users. MPC was recognized by Microsoft Corporation in 2006 with an “Innovator of The Year Award” for one of the best implementations of Microsoft technologies in support of the Warfighter.

We have also implemented innovative SharePoint® solutions for the Air Armament Center’s headquarters staff and Armament Directorate (AAC/EB). We automated numerous internal processes, including the storage and workflow coordination of project and program documentation.

We are uniquely qualified to quickly establish a SharePoint®-based IDE for IITA. Within 30 days of task award, we will consider and implement, in consultation with IITA as to best approach based on available resources, any of the following options for IDE implementation:

- Establish the IDE portal on an IITA-provided SharePoint® portal
- Establish the IDE portal on a company-provided SharePoint® portal
- Facilitate discussions to host the IDE portal on MPC
- Facilitate discussions to adapt and port AAC/EB custom SharePoint® modules into the IDE portal

3.1.3.12 Meetings (IITA BPA 1.5.6.3.4)

Our IPTs routinely participate in program review and technical meetings together with our Government customers and other industry partners. We also routinely produce and distribute minutes, technical interchange notes, plans of action, status reports, and documents derived from or supportive of these meetings. We will support all required meeting activities at the USAFA or other locations as determined by the IITA PMO. Our PM will ensure that meeting minutes and status/action items are distributed within the 24-hour timeline required by the IITA PMO.

3.1.3.13 Project Management Reviews (PMR), Status and Technical Design Meetings (IITA BPA 1.5.6.3.5)

Project management, status, and technical design reviews and meetings are a standard part of our CMMI® Level 3- and ISO9001/AS9100-compliant technical and management processes. We routinely conduct such reviews and meetings on all of our engineering services contracts with multiple customers from across the DoD. We will meet all requirements for management, status, and technical design reviews and meetings, to include the presentation of metrics, the advance delivery of presentation materials to the Government, and submission of minutes by the next business day.

3.1.4 Teaming Arrangements (RFQ 8.1(2))

Under this BPA we will continue to work with our current WEdge task order subcontractor, Navagis. Navagis is a Google Earth Enterprise Partner and ***the only company in the world devoted exclusively to installation, training, administration, and custom solutions development using the Google Earth Enterprise***. Navagis is also ***the only Google Earth Enterprise Partner company to have been contracted by Google itself for in-house support and consultation for the development of the next generation of the Google Earth Enterprise***.

Within the federal space, Navagis has implemented numerous Google Earth Enterprise solutions that are directly relevant to your task order requirements:

- **US Army—**Navagis built the portable globe solution for the 75th Ranger Regiment, configured their Google Earth Enterprise, and provided all of the in-depth training for Fusion, Portable globe cutting, and the Portable Server
- **U.S. Army—**Navagis provided installation of Google Earth Enterprise on three separate networks (NIPR, SIPR, and Joint Worldwide Intelligence Communications System [JWICS]) for the U.S. Army Training and Doctrine Command (TRADOC) at Ft Huachuca, AZ. They performed the complete system set-up to include the operating system (OS) installation, Network Attached Storage (NAS) set-up and configuration, Google Earth Enterprise installation, and network configurations. Navagis provided in-depth Fusion and Earth server training to the TRADOC staff
- **U.S. Army—**Navagis installed, configured, and provided the training for the Google Earth Enterprise system at U.S. Army Space & Missile Defense Command, Redstone Arsenal, AL
- **Defense Information Systems Agency (DISA)—**Navagis installed, configured, and provided in-depth Fusion and Earth server training for the Joint Interoperability Test Command
- **U.S. Air Force—**Navagis installed, configured, and provided in-depth Fusion and Earth server training at Hanscom AFB, MA
- **Department of Justice, Drug Enforcement Administration—**Navagis provided the installation and configuration for the Google Earth Enterprise at the El Paso Intelligence Center on Ft Bliss, TX. Navagis also provided in-depth training on Fusion and Earth Server, as well as training on how to integrate their Google Maps API applications with the Google Earth Enterprise system

Navagis has also consulted and partnered with, and developed Google Earth Enterprise geospatial solutions for, major global corporations, including Lockheed-Martin, L-3 Communications, and Raytheon in the U.S. defense sector; BHP Billiton, a global mining company with headquarters in Australia and England; and Burns & McDonnell and CDM, both of which are international engineering firms. Navagis has also provided Google Earth Enterprise consulting and solutions development for the governments of Israel and Greece and state governments such as Mississippi, Texas, and Alabama.

With its unique qualifications and singular focus on the Google Earth Enterprise platform, ***Navagis has brought and will continue to bring an unequaled level of expertise and skill to the WGC for production and dissemination of your Google Earth globes***.

Under our subcontract agreement for this BPA, we do not simply turn over the Google Earth and geospatial activities to Navagis. Rather, ***they function together with us as fully integrated partners***. This unique arrangement provides maximum benefit to you. While the technology and logistics required for Google Earth globe production is a clear focus of the WGC area, it is highly dependent upon interface and interaction with the operational customers for requirements understanding and management. Jacobs/TYBRIN has operations and mission planning SMEs directly embedded in virtually every flying unit in the Air Force, including Air Mobility Command units. We bring the operational mission focus that is required to execute the WGC task IAW the Warfighters' operational needs.

We are confident that the combined technical and operational expertise and qualifications of Jacobs/TYBRIN and Navagis in executing any WGC tasking will be unmatched by any other potential vendor.

3.1.5 Management of Business Volume (RFQ 12.3(c))

Our management philosophy will be to maintain a team with core functionality in all four specified performance categories. This core team will be built upon the current expertise that exists in the WEdge PWS teams currently in place. As additional work is awarded and defined, this team will provide the expertise, background knowledge, and leadership to bring new employees up to speed quickly and efficiently. We anticipate there will be the need at times to quickly ramp up/down. section 3.1.5.1 identifies a number or risk mitigation strategies to manage this fluctuating business volume.

3.1.5.1 Business Volume Risk Mitigation (RFQ 12.3(c))

3.1.5.1.1 Initial Task Order Response Risk

A key challenge in managing business volume under an Indefinite Delivery/Indefinite Quantity (IDIQ) BPA is having a process and capability to rapidly respond to task order job calls from the Government. Our experience with these types of contract vehicles is that a 10-day limit on task order responses is quite common and 5-day limits are not unheard of. A successful BPA participant must be able to prepare and submit task order responses consisting of a technical solution, staffing plan, and price quote within these time constraints on a regular and repeated basis. Without such a plan, the BPA participant will likely not be able to submit a task order response in time and the Government is at risk of not receiving the full anticipated benefit of the BPA due to reduced competition and limited choices among offered solutions and prices.

To mitigate this risk, we employ a Task Order Swat Team and an expedited task order response process that will enable us to meet task order suspenses within as little as seven (7) days. The Task Order Swat Team is a group of pre-identified management and technical experts within the ETD who are specifically chartered to respond to task order opportunities.

The Swat team consists of the ETD Division Director, ETD Director of Operations, the BPA PM, and pre-identified technical SMEs in specific domains such as software engineering and development, geospatial engineering, IT support, and more. Within two to four hours of a task order job call from the Government, the Swat team convenes to evaluate the task order requirements, identify and outline the technical solution, evaluate strategies for staffing and price, make task order proposal writing assignments, and set the schedule for completing and submitting the task order response to the Government. Our expedited task order response is summarized as follows:

Day 1	❑ Swat team reviews task order opportunity and makes bid decision ❑ ETD Director chairs Kick-Off meeting with all corporate staff (Human Resources (HR), contracting, finance, proposal management)
Days 2 – 4	❑ Program manager refines staffing and salary data for pricing, determines staffing strategy (e.g., new hires, overtime, reachback) ❑ Pricing assembles cost data and prepares price quote ❑ HR identifies and interviews candidates ❑ SMEs write technical solution
Day 5	❑ Contracts reviews developing proposal for compliance ❑ Red Team reviews technical and cost proposal for quality and competitiveness
Day 6	❑ SMEs and Pricing make recommended Red Team updates ❑ ETD Director conducts final Gold Team review of the proposal ❑ Senior Executive Management approves
Day 7	❑ Contracts performs final audit of proposal package for compliance ❑ Proposal Production performs final format and editing ❑ Proposal is submitted to the Government

3.1.5.1.2 Staffing Risks

The types of task orders anticipated on the IITA BPA present particular challenges for staffing. As noted in section 3.1.5.1.1, task order response and work start times are likely to be short, requiring a quick identification of personnel. Many of the task orders on this BPA are likely to involve prototype or proof of concept work that may be very short in duration. Filling such short duration work assignments can be

problematic as most skilled professionals will be primarily interested in longer term assignments and will either decline such an offer or take it and then leave upon finding a more permanent position. This type of staffing turbulence represents a risk to timely and successful completion of the Government's objectives.

We have available at our disposal and may exercise many options for managing these staffing challenges as follows:

- Reassignment or resource re-leveling of existing Jacobs/TYBRIN team members currently at IITA
- Voluntary overtime by Jacobs/TYBRIN team members currently at IITA
- Reassignment or resource re-leveling of effort across the 300 other technical professionals in ETD
- Voluntary overtime by other ETD staff
- Reach across Jacobs through our IWA process (see section 3.1.3.8)
- Use of our Alumni Association and Reserve Corps assets (see section 3.1.3.8)
- Engagement of qualified local-area professionals in a consultant or part-time status
- Addition of specialized Contractor Teaming Arrangement (CTA) or subcontract partners in response to specific task order requirements
- Use of professional search services that specialize in specific technical domains such as geosearch.com for geospatial engineering professionals

3.1.5.1.3 Loss of Continuity and Knowledge During Draw Downs

Just as a short-notice requirement to add staff creates risks, so does a short-notice requirement to reduce staff. This is often the case in an IDIQ task order environment where timing of Government task order requirements does not always allow the smooth transition of staff talent from one task order that is ending to another that is beginning.

It is not the normal practice of the industry to maintain idle staff on payroll for a lengthy period of time awaiting future task order charging opportunities. In the absence of a direct charge task order, excess staff will usually be terminated after a certain period of time. While this is logistically a simple matter, it creates a risk that experience, knowledge, and continuity that may be needed for future task order work is no longer available, not to mention the potentially negative impact to morale and the work environment for those who remain.

We will make every effort to retain skilled and knowledgeable staff to the greatest extent possible. We understand the importance of retaining knowledge and establishing continuity throughout our team. One way we will do this is by what we call ***"re-leveling."*** That is, if an employee completes his or her work and cannot be directly transitioned to another IITA BPA task, we will try to spread work across the entire team to keep that individual. If other personnel are working overtime, we will assign the newly-idled personnel to that work. If such reallocation of work is not possible, we will try to transition that individual to other work within Jacobs until another IITA BPA task opportunity becomes available. Re-leveling increases morale as personnel are not overworked and know that their jobs are safe.

In the event idled staff cannot be retained in this fashion, our CMMI and ISO9001 quality processes, coupled with faithful execution of our program management plans, will ensure maximum capture of knowledge and experience through our product documentation and CM processes. ***We will also conduct an exit audit for all departing staff to ensure that the information required for continuity and restart of the same or similar work is captured prior to their departure***.

3.1.6 Approach to Maintain Cooperative Nature with Other BPA Holders (RFQ 12.3(c))

First among Jacobs' Core Values is, "We are a relationship-based company." We embody that value by keeping the success and well-being of the customer in the forefront of our thinking at all times. Our actions and activities will always be carried out with the success of your mission as our first priority.

The structure of the BPA that IITA has chosen is very much like the organization adopted by the Government Program Manager for our showcase PEX project. Although the four contractors contributing to PEX are on different contract vehicles, we nevertheless function together with them as a single,

integrated enterprise, sharing knowledge and experience, integrating our respective project outputs into an overarching product, and working cooperatively toward mission success.

Ms. Linda Crabtree, the senior PM we have selected to lead our BPA team, is fully committed to this principle and ***has already successfully implemented it at IITA WEdge***. "Working Relationships" is one of the key performance factors that every Jacobs/TYBRIN employee is rated on as part of their annual performance evaluation. Other contractor companies that the Government has designated for us to work with are included in that evaluation factor. Ms. Crabtree will encourage this behavior not only through her own example and personal counsel, but also by holding each employee accountable for it in his or her own conduct, ***and evaluating and commenting on that conduct as part of the formal evaluation process***.

3.1.7 USAFA Network Compliance (IITA BPA 1.5.6.8.6)

Our service team members routinely work inside USAF and DoD networks requiring not only IA training and qualifications, but also special clearances and accesses up to TOP SECRET. Our ETD, which is where the IITA team will be organizationally hosted, ***spent $275,000 dollars in FY2010 to obtain and maintain DoD 8570 IA training and qualifications for our work force***. ***Our employees hold 390 DoD 8570 certifications, including 44 Certified Information Systems Security Professionals (CISSP),*** which is the most rigorous and demanding security qualification.

All our employees undergo internal quarterly security training, which covers all aspects of information, operations, communications, and personnel security. We also complete Government-assigned security training per specific contract or task order requirements. Our IITA engineering team will be ***100% compliant with all USAFA information and security training requirements***.

3.1.8 Additional PWS Requirements (IITA BPA 1.5.6.4 through 1.5.6.11, 1.6, and 1.7, Excluding 1.5.6.8.6)

We will meet all Government requirements for proprietary information, data accession, software sustainment incident reporting, task information release, security, place of performance, travel, and service provider purchases. Also, we will meet all deliverables requirements in electronic format and we understand the inspection process. Finally, we will support field installation and support tasks during a crisis as required.

INSTITUTE FOR INFORMATION TECHNOLOGY APPLICATIONS
BLANKET PURCHASE AGREEMENT
FACTOR 2 – RELEVANT EXPERIENCE/PAST PERFORMANCE

RFQ643526
12RT0064

6 February 2012

Prepared for:
Attn: Heidi Sawyer Contracting Officer
heidi.sawyer@gsa.gov

Prepared by:
Jacobs/TYBRIN Group
1030 Titan Court
Fort Walton Beach, FL 32547

Point of Contact:
Sam Revill
850-882-9740
samuel.revill@tybrin.com

TABLE OF CONTENTS

RELEVANT EXPERIENCE/PAST PERFORMANCE

1 INTRODUCTION

To demonstrate the relevance of our experience, we are providing information on five contracts and/or task orders:

- WEdge Software Engineering and Geospatial Support (GST0811BP0235)
- Software Engineering Support (SES) (F08635-02-C-0034)
- Defense Information Technology Contracting Organization (DITCO) Tanker, Airlift, and Special Mission (TASM) (HC101307F3328)
- Mission Planning Support Contract (MPSC) (F42600-01-D-0027)
- Aviation and Missile Command (AMCOM) Express - Portable Flight Planning System (PFPS) (4600005749/101521.0020.PF – Task Order #0021)

We are confident that our past performance citations will demonstrate not only the ability to meet your current and short-term needs, but also the ability to grow with you over the course of this contract. We can help you achieve your objectives as identified in Attachment 1 of this procurement, providing outstanding support to Institute for Information Technology Applications (IITA) providing software engineering, information technology (IT), and geospatial engineering. Our confidence arises from a simple fact: we have done it before, are doing it now, and have achieved very high levels of quality and customer satisfaction through our performance.

2 RELEVANT EFFORTS

2.1 WEdge Software Engineering and Geospatial Support

Contractor Name:	Jacobs Technology/TYBRIN Group		
Contract Number:	GST0811BP0235		
Contract Title/Location:	WEdge Software Engineering and Geospatial Support Colorado Springs, CO		
Date of Award and Completion (PoP):	September 30, 2011-September 29, 2012		
Contract Type	IT70 Task Order	**Dollar Value at Award**	$1.37M
Dollar Value with any Modifications	$1.37M		
POC Name/Title:	Heidi Sawyer, Contracting Officer		
Address	U.S. General Services Administration, Rocky Mountain Region, Building 41, Denver Federal Center, Denver, CO 90225-0546		
Phone Number:	(303) 236-5032		
E-Mail Address	heidi.sawyer@gsa.gov		
POC Name/Title:	Lt Col Andrew Berry, Contracting Officer's Technical Representative		
Address	U.S. Air Force Academy, 2354 Fairchild Dr., USAFA, CO 80840		
Phone Number:	(719) 333-9798		
E-Mail Address	andrew.berry@wedge.hpc.mil		
Description of Project			
Under the GSA WEdge task order, we provide software and geospatial engineering services to the Warfighters Edge (WEdge) and Warfighters Geospatial Center (WGC) directorates within the United States Air Force Academy (USAFA) Institute for Information Technology Applications (IITA). The GSA WEdge task order involves three areas of execution: 1) Development of a File Replication Service for the sharing of data over a widely dispersed network based on the WEdgeNET, a locally developed, Service Oriented Architecture (SOA)-based application extensibility framework; 2) Completion of the WEdgeViewer, which reads mission planning flight route data from the Portable Flight Planning System (PFPS), modifies the route, and writes the new route back to PFPS; and 3) Google Earth globe production and dissemination using Google Earth Enterprise and Google Fusion.			

Performance Category 1: Geospatial Services

We provide ***geospatial engineering and Google Enterprise globe building services and expertise*** for the IITA WGC at the USAFA. Our activities on this contract are precisely those described in and highly relevant to the IITA BPA performance work statement. We assumed task execution and production responsibility without retaining incumbent employees. This required us to recruit, hire, and stand up an entirely new team of geospatial engineering professionals in a very short period of time, quickly comprehend the state and location of WGC assets, and deliver on production commitments made by the departing contractor with no transition assistance from them. Despite these many challenges, our geospatial engineering team ***successfully delivered a 2D Afghanistan map on time with very short notice immediately after task assumption*** and with highly restricted access to WGC resources imposed by the departing incumbent.

We established daily stand-up meetings for the WGC team and weekly requirements and status meetings with Air Mobility Command Directorate of Intelligence (AMC/A2) that have greatly improved requirements understanding and workflow execution in the WGC. Many of the resources, tools, and processes required for Google Earth globe production were left in a poorly configured or less than optimal state. The Fusion asset root was set up incorrectly, which we corrected. We also established a new and much improved process for acquiring and processing geospatial source data. We installed Global Mapper software to aid in preprocessing of the source data for streamlined incorporation into the Fusion process and ESRI ArcInfo 10 for data management. In addition, we corrected several problems with the WGC Linux servers and network, as described below under Performance Category 4: Information Technology Support.

The COCOMv2 globe was a major production project already underway at task start, which the departing incumbent left in a state that was incomplete and of suspect quality. The customer also added significant new requirements to the COCOMv2 globe such as inclusion of maps at varying scales (GNC, ONC, JNC, TPC, JOG-A), point-of-interest search function, and same year/same season imagery. While not able to adopt all of the new requirements due to limitations in available source data, we successfully incorporated three of the map types as super-overlays. During production, we discovered and replaced poor quality and aging imagery that was mixed in and overlapping with better quality, more current imagery. We also found and removed excess imagery that was not within any of the areas of interest and that unnecessarily increased the volume of raw data, data transfer times, length of the Fusion process, and resulting size of the finished globe. Finally, we identified issues with terrain source data (voids, sinks) used for the COCOMv2 globe, as well as globes previously delivered by the departing incumbent that affected the quality of the globes.

We ***cleaned up and completed the initial COCOMv2 globe build*** as of December 31, 2011—approximately 90 days following an unsupported transition for this contract task—followed by one update on January 10, 2012. The finished COCOMv2 globe was submitted to AMC/A2 for final review and approval on January 23, 2012. In the same time period, we have completed and delivered other globe and map projects for various customers to include a 29 Palms globe, a Creech 2D map, and a Jordan globe. We are researching and obtaining new terrain sources to improve the quality of future globe deliveries. Maps that could not be incorporated into the COCOMv2 globe are under review with the data provider and we are researching alternate sources for these maps as well.

We have worked closely with, and established productive relationships with, the High Performance Computing Centers (HPCs). To overcome severe bandwidth limitations in the network transfer of source and globe data between the WGC and Wright-Patterson HPC, we built, and are physically shipping them, a server and storage array with all of the required data to start the processing of the Worldv1 globe for delivery on Google Earth Enterprise servers in summer 2012.

Performance Category 2: Software Development and Research

We are ***developing the WEdgeNET File Replication Service***, a plug-in to the WEdgeNET architecture, which is an extensible framework for information sharing across a distributed network. WEdgeNET provides SOA-based brokers and multiple Service Provider Hosts (SPH) that communicate using

Simple Object Access Protocol (SOAP) packages over Microsoft® Windows Communication Foundation (WCF) services. All WEdgeNET and File Replication Service development is carried out in Visual Studio on the .Net Framework and C# programming language.

The state of the WEdgeNET project, as left by the departing incumbent and described more fully below under Performance Category 3: Software Maintenance and Modifications, prevented the commencement of any meaningful development work on the File Replication Service at task start-up. WEdgeNET was not in a functional or releasable state. Thus, we were required to conduct lengthy and extensive research, analysis, code study, and consultation with other WEdge contractor personnel to develop an understanding of the WEdgeNET architecture and code to bring the WEdgeNET to a state where we could work with it to carry out our primary contract task, which was development of the File Replication Service plug-in.

We identified key services missing from the existing WEdgeNET architecture that would be necessary to develop the replication service. These included a storage repository, security services, and possibly a packaging service. We have identified the repository as the most critical element and have developed numerous options and alternatives, settling finally on the use of a SQL Server database, which is currently undergoing design. We have also identified Windows Identity Foundation for the basis of service security, Microsoft® Sync as the basis for packaging and replication, and are currently executing proof of concept prototypes using these services.

We reviewed the IITA/WEdge Scrum Agile processes and templates and modified the process to a Microsoft® Solutions Framework (MSF) Agile style. Under these Agile processes, we conduct daily stand-ups, two-week iterations, bi-weekly planning meetings, and a release cycle of six iterations. We have integrated our development process with Team Foundation Server and the MSF Agile template for our coordination site.

Performance Category 3: Software Maintenance and Modification

As noted above, the WEdgeNET service was not in a fully functional state at the beginning of our task performance. The departing incumbent left no documentation, provided our development team with less than two hours of verbal exchange concerning this project, and employed no disciplined configuration management (CM) or version control during their development activities. As a result, we encountered multiple, undocumented versions of the WEdgeNET framework code in the development environment, none of which were in a state that was sufficient for us to develop against. We successfully picked up and modified the WEdgeNET code to bring it to an operational state and enable commencement of development on the File Replication Service.

We also applied ***knowledge and experience with .NET software development, PFPS RouteServer, and FalconView*** for continued development of the WEdgeViewer. WEdgeViewer is a C# application that we were to modify. We were provided the latest version of the WEdgeViewer software and its documentation and tasked to create a prototype. After quickly coming up to speed on the requirements, the WEdgeViewer code, and the Google Earth application programming interfaces (APIs), we were able to complete the modification according to our customer's requirements. The modification allowed the user to move a point from within the WEdgeViewer, interacting with the PFPS RouteServer to preserve the changes in the open route domain object and returning any subsequent route changes made by the RouteServer to update the KML file's display that is rendered in the WEdge Viewer client. This is an entirely consistent outgrowth of the first requirement and represents "closing the loop" on enabling the WEdgeViewer to have the capability to view and edit PFPS RouteServer routes in such a way that data changes are properly preserved in both environments to ensure mission planning data currency. We were able to modify the necessary code to realize this functionality by exploiting the appropriate Google Earth, PFPS RouteServer, and Falcon View API functions to save KML and the PFPS-based representations of the visualized "route of flight." We have also begun the process of looking at, analyzing, and fixing known, prioritized errors in the previously released version.

Performance Category 4: Information Technology Support

The WGC team discovered and corrected numerous problems in the WGC network and server

environment. The network and processing servers were not configured for optimal performance and the three servers allocated to the WGC had unsupported operating systems. We executed a complete rebuild of the WGC network, reconfiguring the firewall and network/subnet structure. We immediately rebuilt one of the non-compliant servers to support current production needs, developed a plan and schedule for rebuilding the remaining two not to interfere with ongoing globe production activities, and rebuilt the servers with approved operating systems. Within a very short time period after assumption of the task, the WGC was then physically moved to another building, requiring us to ***completely dismantle, move, and rebuild the network again in the new location, to include installation of infrastructure and re-establishing connectivity to the production server***.

We are working with the USAFA and outside agencies to implement improvements in configuration between the WGC production office and the server location, including configuring a new switch over fiber to increase data transfer from 1GB to 10GB. All servers are being reconfigured with the fastest CPUs and maximum number of cores to maximize throughput.

Management

One of the greatest management challenges on assumption of this task was the lack of any transition support from, and open hostility on the part of, the outgoing incumbent, with whom we had 30 days of on-site overlap. Our team conducted themselves with the utmost of professionalism during this period, reaching out to obtain necessary resources and information from wherever we could find it and successfully assuming execution of task order activities.

We provide a dedicated, on-site Program Manager (PM) with oversight on all tasks, providing a central point for coordination with the customers. We also assigned a technical lead for each specific project to support the teams and customer on a daily basis. Our highest priority at the beginning of this contract was focused on getting the WGC team up and functioning in order to alleviate AMC's concerns over the contractor change and to meet the deliverables schedule. We quickly staffed the WGC team with geospatial and Google Earth experts, some with very recent combat experience, and immediately focused them on the customer's mission.

In light of the zero-length transition period and lack of incumbents, we deployed our Engineering and Test Division (ETD) Director of Operations to Colorado Springs to conduct an intensive three-week period of recruiting and hiring. ***This was done at no cost to the Government***. This allowed our WEdge PM to concentrate on standing up the technical work and resulted in the assembling of a very high-quality team of software and geospatial engineering professionals.

To facilitate communication with management, we have implemented a daily stand-up meeting within each team that is supported by the PM. This allows insight into the tasks and the issues the teams are dealing with so action can be taken quickly when needed. We also participate in a weekly status/project management review (PMR) meeting with the WEdge Department of Defense (DoD) PM. The WGC team supplements the weekly PMR through telecom with AMC for the status of current and future globe requirements.

We have ***provided all required deliverables on time***, which includes a Quality Assurance Plan (QAP), Project Management Plan, separate Configuration Management Plan (CMP) for software development and WGC operations, bi-weekly PMR slides covering status, schedule and costs, and an additional schedule update in the intervening weeks.

2.2 Software Engineering Support (SES)

Contractor Name:	Jacobs/TYBRIN		
Contract Number:	F08635-02-C-0034		
Contract Title/Location:	Software Engineering Support (SES), Eglin Air Force Base, FL		
Date of Award and Completion (PoP):	1 Oct 2002 – 30 Sep 2012		
Contract Type	CPAF	**Dollar Value at Award**	$10,254,420
Dollar Value with any Modifications	$410M		
POC Name/Title:	Kevin Miller, Contracting Officer		

Address	205 West D. Avenue, Building 350 Eglin Air Force Base, FL, 32542
Phone Number:	(850) 882-2675
E-Mail Address	kevin.miller@eglin.af.mil
POC Name/Title:	Barbara Aguirre, Program Manager
Address	201 West Eglin Blvd, Building 380 Eglin Air Force Base, FL 32542
Phone Number:	(850) 882-4274
E-Mail Address	barbara.aguirre@eglin.af.mil

Description of Project

We provide multidiscipline software and systems engineering services to the Air Armament Center (AAC) at Eglin AFB, tenant organizations, and other external agencies and organizations. During FY2011, we provided approximately 320 contract man-year equivalents to deliver services that included development, delivery, and support of large software applications for Air Force-wide use. We also perform formal software and systems test and evaluation (T&E) on more than 70 Air Force and DoD mission planning, command and control (C2), and data link systems, as well as network engineering, information assurance (IA), and security planning and implementation.

Performance Category 1: Geospatial Services

The Center Scheduling Enterprise (CSE)—our Air Force standard range scheduling and resource management system (more fully described in Performance Category 2 below)—***ingests geospatial data from multiple sources representing the three-dimensional ground and airspace resources*** making up the range areas under management. This includes multiple thematic layers such as geo-political boundaries, natural and manmade features, wildlife and endangered species habitat, tracks of flight, range and airspace boundaries, and altitude limits. In addition to displaying these geospatial features in the CSE web interface for user visualization and management of range assets, CSE also performs complex geospatial comparisons and deconfliction of range asset requests to ensure safe separation of multiple missions in the horizontal, vertical, and time domains.

The Gulf Range Drone Control System (GRDCS)—developed by TYBRIN on the SES contract—***incorporates Google Earth globes and map data into a real-time C2 system to remotely fly unmanned target aircraft over the Gulf of Mexico*** for engagement in live air-to-air missile test and training scenarios. GRDCS controls all aspects of the target aircraft operation from takeoff to landing, and the GRDCS Google Earth display depicts the location and flight path of the target aircraft as well as all of the shooters in real time.

We administer several High Performance Computing (HPC) clusters in the Air Force SEEK EAGLE Office (AFSEO). We configure, manage, administer, and maintain a production HPC cluster consisting of 2,600+ computing cores for advanced scientific, engineering, and computational fluid dynamic processing. In addition to the production core, we also maintain two test/development clusters consisting of 144 and 32 cores each as well as a 72-core cluster for special projects. All clusters run Red Hat Enterprise Linux 5 as their primary operating system.

Performance Category 2: Software Development and Research

Two applications developed under SES are ***particularly relevant to the requirements of the IITA BPA PWS: Patriot Excalibur*** (***PEX***) ***and CSE***. Both programs are conducted in environments consisting of a fully integrated development and server environment based on the Microsoft® .Net platform and Team Foundation Server. Both programs are led and managed by our personnel, but include an Integrated Project Team (IPT) that includes members from other contractor partners (PEX) and the Government (CSE). For both programs, we are responsible for all aspects of system engineering and development, to include eliciting and documenting requirements, development and testing, and distribution of new or modified software components.

Both programs implement XML schemas, SOAP, web services, and SOA features to enable external programs to interact with and consume data in the form of W3C standards-compliant XML documents. Business logic is shared across multiple applications, both on the local intranet and with external systems across the NIPRNet. For example, PEX exposes functions and data as part of the Air Force's

Flight Scheduling Community of Interest, and the CSE system shares data across the NIPRNet with the Federal Aviation Administration (FAA). PEX also implements multiple WS-* standards for transactions across wide area network (WAN), including security standards such as Windows and WS-Trust using Security Assertion Markup Language (SAML) tokens.

PEX is in use in 700 operational squadrons across the Air Force. It is ***designed to provide both .NET thick client and web user interfaces using Agile development methods*** that decompose requirements into small, iterative updates that can be released on a very rapid timetable, with an updated PEX distribution going to the field every 26 weeks. Our PEX team maintains a constant flow of communication with the PEX operational Air Force community through the PEX help desk, a dedicated PEX web site, an annual PEX user conference, a robust PEX training program (involving formal classes at our Northwest Florida PEX facility and a traveling PEX support team), and participation in the annual Mission Planning User's Conference (MPUC), among others. Capitalizing on these opportunities, the PEX team is able to rapidly gather and assess evolving requirements and to assess and address any issues with currently fielded systems. PEX is subjected to a rigorous security testing process in an environment configured according to the DoD Federal Desktop Core Configuration and Gold Disk standards.

CSE is a ***complex .NET web-based application*** that is used to manage, schedule, and deconflict resources at the Air Force's major ranges: Eglin AFB, Edwards AFB, and Nellis AFB, as well as U.S. Space Command's space training range assets. CSE has also been selected by the U.S. Air Force for management of all combat readiness and tactical training ranges and is currently deployed at 30+ additional locations across the nation.

Performance Category 3: Software Maintenance and Modification

Both CSE and PEX are mature software products that have been in use and under maintenance for several years. Both programs continue to expand in capability in response to new user requirements and architectural requirements.

Over the life cycle of PEX, we have transitioned the program from a purely thick client application to a ***state-of-the-art SOA-based architecture***. In that same time frame, we carried out a fundamental transformation in the engineering approach for development and maintenance ***from a classic waterfall methodology to an Agile approach that is now recognized throughout the DoD as a leading edge best practice***. We have also added new, major areas of functionality. What started out primarily as an aircrew scheduling aid has been transformed into an entire operations management toolset that includes not only aircrew scheduling, but also training and certifications, standardization and evaluation, and aircraft maintenance. Each of these new functional capabilities represents an entirely new set of design features that had to be seamlessly integrated into the existing PEX baseline.

CSE presented one of the most difficult maintenance and transformation tasks imaginable. CSE was conceived to replace an obsolete mainframe application—Resource Scheduling and Operations Management System (RESOMS)—that had been in use for Eglin Range scheduling for well over 20 years. Although CSE was to represent a technological quantum leap from a closed-system mainframe to a web-based architecture, the long-time familiarity of the Eglin range community with the features and capabilities of RESOMS dictated that CSE mimic the behaviors of RESOMS to a large extent. This required the CSE team to examine, analyze, and understand the functions of many hundreds of thousands of lines of 20-year-old code, without documentation and without access to the original programmers. At the same time, the CSE team recognized that there were distinct advantages in modifying many RESOMS behaviors to take advantage of the newer architecture. The result was a successful merging of the old and the new into a system that not only successfully replaced its legacy ancestor, but was subsequently adopted and deployed across the entire Air Force.

Both PEX and CSE have kept pace with, and been maintained and modified to take advantage of, advanced software engineering and development and to incorporate new architectural designs and features such as SOA, WCF, and Windows Presentation Foundation (WPF). CSE was the first project

within the entire Eglin IT community to adopt the Microsoft® .Net Framework beginning with the first beta release of .Net 1.0. Both programs use .Net languages (PEX – C#; CSE – VB.Net) and have transitioned their authentication methods over from a traditional username/password model to a model based on Public Key Infrastructure (PKI) certificates and Common Access Cards. In addition, both programs have been modified to successfully meet the many requirements of the Information Assurance and DoD Information Assurance Certification and Accreditation Process (DIACAP) requirements that were levied on them several years after their initial foundations and designs were first laid down. Both programs have also incorporated numerous external components and capabilities to enhance their functions; for example, ***CSE integrates a geospatial analysis engine from GeoMedia***, a highly regarded GIS vendor.

Performance Category 4: Information Technology Support

Under the Armament Directorate Secure Networks task, we provide network engineering and IT support services to include design, test, implementation, operation, and maintenance of classified and unclassified networks using Microsoft® Windows, Sun Solaris, and Linux systems that comply with specific and approved national security directives and standards. Our personnel install and support routers, cabling, switches, and in-line encryption devices for ***transport of data at the TOP SECRET level***. We develop and maintain a configuration management plan, perform user account maintenance, conduct backups, and identify and diagnose problems and factors affecting classified and unclassified network and stand-alone system performance. We are proficient in the use of multiple diagnostic and evaluation tools and follow and enforce standard operating procedures (SOPs) and automated information security plans. The Armament Directorate team of 35 network engineering and IT professionals is ***100% DoD 8570 certified***, including 6 Certified Information Systems Security Professional (CISSP) personnel. We perform client support administration for classified and unclassified information systems as defined in AFI 33-115. We maintain a help desk system to respond to customer needs and handle approximately 3,000 help desk tickets per month. Our Client Support Administration and help desk functions received the Wing Top Gun Award for outstanding performance. We are highly experienced with Eglin network, client, and account management systems such as Enterprise Shared Data Intranet (ESDI) and Account Management Intranet (AMI). We manage time-compliant network orders (TCNOs) to successfully issue and install 20K-30K patches per month. We also conduct inventory of secure communications equipment, computer hardware and software, ensure all software licensing agreements are adhered to, provide software inventory accountability according to AFI 33-114, and are assigned as unit software license manager for the directorate, working closely with and reporting compliance status to the Eglin AFB software license manager.

Under the AFSEO IT Support task, we provide the full range of IT support for a specialized research, engineering, and modeling and simulation organization that has highly unique requirements for specially configured platforms and engineering work stations. We perform installation, configuration, maintenance, and portfolio management for this IT environment—including all Information Assurance and Certification and Accreditation activities—on a mixed Windows/Linux/Apple network. We performed all the necessary planning and security activities to establish an AFSEO enclave separate from the host base network. This was required to enable the use of the non-standard configurations and applications required to support the advanced research and development activities within this organization. We are now in the process of migrating the users and their equipment into the new enclave.

Management

We were awarded the first SES contract in 1987 and have won each subsequent recompete. Our Contractor Performance Assessment Report (CPAR) ratings for technical, schedule, management, and cost performance are consistently ***"Exceptional"*** across the entire period of performance. ***We have received 100% for 17 consecutive six-month award fee periods***.

The SES contract is managed by a senior program manager who is co-located on-base in Government facilities. He is directly responsible for a workforce of over 320 personnel, which is

subdivided into 26 functional teams, each managed by a senior team leader. The team leaders report directly to the site manager. The site manager and team leaders are in daily, constant contact with the supported Government customers and receive real-time feedback on performance and task requirements.

The SES program manager/site manager conducts a formal program review meeting with the Government on a weekly basis to address all matters pertaining to technical, schedule, management, and cost performance. Additionally, the functional teams prepare and submit a monthly program progress report on their specific tasks providing details on all work accomplished, notable program successes, problems encountered, and solutions implemented. All team leaders have full and unrestricted access to the site manager. In addition to daily oral and email communication as needed, the site manager convenes all team leaders together in a formal monthly meeting. The monthly site managers meeting provides a formal, documented vehicle by which the site manager conveys information to and receives information from the team leaders concerning program performance as well as other topics concerning employee health, safety, welfare, and morale. With the redundancy of formal and informal communications channels, the site manager is readily apprised of any problems or issues that may impact contract performance and is empowered to take all necessary actions to immediately respond to Government requests and resolve problems.

The SES contract involves frequent contact, coordination, and cooperation with other contracts and contractor personnel supporting the Air Armament Center. SES personnel always act in support of the Government's mission and objectives and frequently operate as members of a multi-organization (Government and contractor) integrated team to achieve mission success.

2.3 Defense Information Technology Contracting Organization (DITCO) Tanker, Airlift, and Special Mission (TASM)

Contractor Name:	Jacobs/TYBRIN		
Contract Number:	HC101307F3328		
Contract Title/Location:	Defense Information Technology Contracting Organization (DITCO) Tanker, Airlift, and Special Mission (TASM)/Nashua, NH		
Date of Award and Completion (PoP):	September 2007 - August 2011		
Contract Type	T&M	**Dollar Value at Award**	$549,740
Dollar Value with any Modifications	$28,100,000		
POC Name/Title:	Virginia A. (Ginni) McCann, Contracting Officer		
Address	2300 East Drive, Bldg 3600, Scott AFB IL 62225		
Phone Number:	(618) 229-9720		
E-Mail Address	Virginia.mccann@disa.mil		
POC Name/Title:	Bob Radford, DAF		
Address	ESC/HBMG (Mobility/CSAR Branch) Airspace Mission Planning Division 11 Barksdale Street, Bldg 1614, Hanscom AFB MA 01731-1700		
Phone Number:	(781) 225-9489		
E-Mail Address	Robert.radford@hanscom.af.mil		

Description of Project

Under this contract, we were awarded a ***three-year blanket purchase agreement (BPA)*** with a $25M ceiling. The purpose of this program is to develop and/or upgrade the TASM mission planning software components to plug into the TASM framework and PFPS core as each aircraft's avionics changes (i.e., C-5, C-17, KC-10, KC-135, E-3, E-8, C-130J, RC-135, as well as additional platforms such as the C-130 AMP and C-27J). The TASM mission planning products under this contract effort are also upgraded to ensure compliance with future mission planning systems (such as Joint Mission Planning System [JMPS]) as well as provide ancillary aircraft support as needed. The development of new capabilities for the TASM Framework, Aircraft/Weapon/Electronic (AWE), Common Components

(CC), Flight Performance Modules (FPM), and any requested mission planning-related System Security Authorization Agreements (SSAAs) are included. In addition to software development, we provide training materials and support Combined Test Force (CTF) reviews, developmental test and evaluation (DT&E), and operation test and evaluation (OT&E) with deficiency write-ups and test reports prior to fielding.

Performance Category 1: Geospatial Services

TASM software components are designed to be compatible with data from various sources with differing retrieval methods, accessed locally or from the Global Information Grid (GIG). Types of data include Aeronautical Advisories such as Notice to Airmen (NOTAMS) Temporary Flight Restrictions (TFRs), Special Use Airspace Activations (SUAS), and FAA Enhanced Traffic Management (ETMS) from the Aeronautical Advisory Server (AAS); weather; National Geospatial-Intelligence Agency (NGA) data such as DAFIF and TFAD-0; and FPMs. Our components can easily incorporate potential future data such as Jeppesen and NGA's next-generation DAFIF (Global Navigation Services - Aeronautical [GNS-A]). Using standard SOAP request/reply, the AAS matches requests for data geospatially utilizing all four dimensions (latitude, longitude, altitude, and time). Requests are ***supported from the suite of TYBRIN-developed front-end clients*** such as the Global Planning Common Component (GP CC) on JMPS, Consolidated Airdrop Tool (CAT), and the TASM AWEs. The Communication, Navigation and Surveillance/Air Traffic Management (CNS/ATM) CC, Terrain Awareness and Warning System (TAWS), and Take-Off and Landing Data (TOLD) utilize these data as well.

Performance Category 2: Software Development and Research

More stringent than CMMI® alone, our software development process was required to satisfy rigorous product safety requirements and ***pass independently-run DO200A audits to obtain FAA certification***. These audits were required as we developed the CNS/ATM CC and AWEs/Unique Planning Capabilities (UPCs) with CNS/ATM requirements. This clearly demonstrates a sound and mature software process that yields quality products and can withstand the rigors of frequent CNS/ATM, CMMI®, and International Organization for Standardization (ISO) audits. Our System/Software Engineering Plan (SSEP) serves as our development plan and provides the guiding principles for the team's software development process. During the DITCO TASM period of performance, we refined our local processes to meet more effectively the needs of a diverse set of programs by adding iterative development and continuous integration (CI) to the code and unit test phase. Our team achieves efficiency by abstracting common functionality into reusable modules (shared components), advocating for reuse across the enterprise, implementing an iterative workflow for the software development cycle, executing a form of test-driven development and CI, and instituting CMMI® Level 3 processes.

Our staff has worked with the TASM product line and its users for 10+ years. We have unparalleled domain expertise as the resident Global Mobility and Special Mission Mission Planning (GMSMMP) technical experts having ***delivered 51 USAF PFPS-based engineering releases, 20 USAF PFPS-based Formal Qualification Testing (FQT) releases, 15 Foreign Military Sales (FMS) PFPS-based engineering releases, and 12 FMS PFPS-based FQT releases***. We have developed TASM mission components using an integrated object oriented process to maximize reusability, resulting in lower development costs and the potential for programs to capitalize on newly added capabilities. We have supported the warfighter for over six years, often being the first asked to collaborate with the Government to help assess and locate where potential safety of flight issues reside.

Performance Category 3: Software Maintenance and Modification

We have a working knowledge of all TASM software components that allows us to maintain compatibility with external data sources, changing operating systems, and avionics updates. Our recent TASM 4000 series of deliveries showcased our ability to get all AMC platforms migrated to the Government Vista Standard Desktop Configuration (SDC) within an 18-month period. Working with AMC and Electronic Systems Center (ESC), we initially developed an incremental strategy to get higher-priority aircraft completed first and then, building upon that, adding new aircraft into each

subsequent delivery. TASM 4000 first delivered the C-5 AMP. The TASM master install was then modified in the TASM 4010 release where C-5 FMS and KC-10 AWEs were added. TASM 4020 then brought in C-130J and KC-135. TASM 4030 added the C-17 and C-130 SCNS aircraft to the master installer and, finally, TASM 4040 included a brand new aircraft, the C-130 AMP. Each of these TASM releases formally underwent FQT and was delivered on a single disk containing installable executables, followed by all of the required artifacts, including source code and Software Version Description (SVD). All TASM software is now compatible with both XP and Vista and we are working on migrating to a Windows 7-based SDC. Our methodologies and expertise enable us to quickly react when Mission Planning Environment (MPE) changes are required, ensuring compatibility across the GMSMMP and MPEs.

Performance Category 4: Information Technology Support

TYBRIN ***embraced Agile programming methodologies across the releases of TASM*** under DITCO TASM. Stand-up meetings were scheduled and held and the work was divided into engineering releases leading to the general release. When required, we employ pair programming to solve a particularly challenging problem or implementation. For releases, we have employed both the Wise and InstallShield installation frameworks and are migrating all installation work to InstallShield. We utilized a dedicated installation person for the DITCO TASM work and have cross-trained at least one member from each team on installation methodologies being employed on their projects. For the DITCO TASM effort, we have a dedicated staff of seven software testers who are dynamically allocated to teams as team needs fluctuate. Our testing methodology embeds the tester into the IPT as soon as feasible and involves all team members in test plan development, reviews, and witnessing. The test effort is a key part of the overall project plan.

On the DITCO TASM contract, TYBRIN has been a ***Mission Planning leader in software security, certification, and accreditation***. We produce an SSAA for each release, develop and deliver on AF SDC platforms, and have been a proactive member in identifying TASM MPE conflicts with established SDC platforms. We routinely bid for, and executed to, DoD security standards, including DoD Directives 8570.1, 8500.01 and 8500.02, and 8510.01, as well as AFI 33-202. We have produced accreditation packages for both client- and server-based software applications for DITCO TASM efforts, including the GP CC client/server technology for aeronautical advisory display. Security is an important aspect of all our reviews, but particularly for the CNS/ATM components. These components are responsible for data within the navigation data chain for an aircraft and are routinely audited by external auditors. Our code has been scanned by both Fortify and AppScan over the life of this program. The AppScan ran against the AAS server environment and found no vulnerabilities. Our coding standards also call for StyleCop analysis of the code to ensure we are meeting coding standards.

We execute a security test as part of each of our FQTs. This test involves a buildup of the MPE from scratch, including the loading and analysis of the latest STIG for the platform. This is true whether this is an SDC- or SSC-based MPE. We routinely use Gold Disk analysis to validate the security settings of the MPEs being delivered. Due to recurring changes in STIG implementations, ***our security team reviews STIGs and DoD security directives as they are released against software in development to minimize issues later in development***.

TYBRIN is in the midst of a transition from Seapine's SCM and TestTrack Pro to Team Foundation Server (TFS). We have laid the foundation to implement our processes in TFS and have trained the development staff on TFS, to include basic functions (such as check-in/out) as well as more advanced topics involving unit testing, test development, and requirements mapping. We have migrated two projects to TFS and have a plan laid out for the remainder to move forward to TFS.

TYBRIN has an established CM plan, which is reviewed and approved by the CNS/ATM auditors on each software release. The plan outlines CM involvement and control over the source code repositories, defect database, and test execution (readiness review through debrief) as well as control over the release process. Under DITCO TASM we have successfully leveraged this plan across 20+ releases of software. Since the CM plan flows from our Organized Set of Standard Processes (OSSP), it can be

tailored to fit the specifics of a contract as long as the tailoring does not affect the tenets of the plan.

Management

We provide well-trained, experienced managers throughout the company. We employ a highly trained staff of ***Project Management Professional's (PMP) that is provided company-sponsored training*** in all aspects of program management. Our managers have received extensive training in earned value management (EVM), our leadership principles, and the employee-based approach to safety in our ***BeyondZero***® program. Project managers have years of experience with cost plus award fee (CPAF), cost plus fixed fee (CPFF), time and materials (T&M), and firm-fixed price (FFP) contracts on software development projects.

Our practice of having smaller, focused IPTs supporting similar aircraft avionics, airframes, and missions allows us to develop resident experts in specific domains. This, coupled with the cross-pollination of resources, has created an exceptionally talented team of engineers with a comprehensive technical understanding in the relationships of our products across teams. To facilitate information flow between the engineering and programmatic organizations, we hold a series of meetings at regular intervals to gather and report information across the entire organization. Within our organizational structure, software and system engineering leads are responsible for ensuring that all development efforts are properly staffed and executed to the published schedule. Weekly integration meetings are held with program managers to assess employee workloads, schedules, budgets, and any topics affecting the manning and execution of projects. These meetings determine engineering staff assignments, which are then communicated to IPT leads and individual employees.

Per out Management and Metrics plan, we ***gather and report metrics*** on source lines of code (SLOC), defect density, software productivity, requirements stability, and defect burn down. These are reported up through TYBRIN management and to the Government where required. These metrics are the source for estimating future work for related efforts. We track our metrics monthly and compare current values to the baseline used to estimate the effort.

With our move to TFS, our ability to provide an IDE is greatly enhanced. Under the DITCO TASM contract, most efforts have several repositories of information. In all cases, the Government is given appropriate access to these repositories. With our TFS implementation, all the artifacts for a given effort are congregated in one location for easy access.

Under the DITCO TASM contract, TYBRIN produces a monthly status report for the Government and reviews the status monthly with Government representatives. This report covers all aspects of the effort for the past month to include financial aspects, accomplishments, milestone schedule reviews, and issues for discussion.

2.4 Mission Planning Support Contract (MPSC)

Contractor Name:	Jacobs/TYBRIN		
Contract Number:	F42600-01-D-0027		
Contract Title/Location:	Mission Planning Support Contract, Hill AFB, UT		
Date of Award and Completion (PoP):	December 2001 - June 2012		
Contract Type	FPAF	**Dollar Value at Award**	$200,000,000
Dollar Value with any Modifications	$439,850,000.00		
POC Name/Title:	Sherry Eldridge, Contracting Official		
Address	6029 Wardleigh Road, Bldg. 1207, Hill AFB, UT 84056-5858		
Phone Number:	(801) 586-3465		
E-Mail Address	Sherry.eldridge@hill.af.mil		
POC Name/Title:	Paul Hairfield, Technical Official		
Address	6137 Wardleigh Road, Bldg 1515, Rm 140, Hill AFB, UT 84056-5858		
Phone Number:	(801) 777-1775		
E-Mail Address	paul.hairfield@hill.af.mil		

Description of Project

Our Mission Planning Support Contract (MPSC) is a large service contract we have performed as the prime for 10 years. Through MPSC, we support the U.S. Air Force, U.S. Army, Air National Guard (ANG), Air Education and Training Command (AETC), and the Air Force Reserve with a team of 300 subject matter experts (SMEs) supporting full-spectrum C2 support for ground forces, intelligence, and aviation assets. Our MPSC work force is made up of professional, highly technical experts with mission planning domain knowledge, IT and IA qualifications, and highly specific knowledge and experience to meet the Air Force requirements within the A2 (Intelligence), A3 (Air, Space, and Operations), A4 (Logistics), A6 (Communications), and A7 (Installation Management) domains. In addition, they actively ***use geospatial products and disseminate and support geospatial information***. The entire workforce has security clearances and many are cleared at the highest levels. The workforce is globally dispersed, ***operating in 138 CONUS and over 20 OCONUS locations***. ***Performance on the contract has been rated Exceptional and the past 18 Award Fee Scores average 96.5%***. The size and scope of the contract has tripled over the past 10 years, largely due to our ability to provide the resources and talent to meet the emerging needs of customers across the full spectrum of civil and military requirements and operations. Most recently, requests have been made to include support for active and ANG Remotely Piloted Aircraft (RPA) Ground Control Stations, Predator and Reaper Operations Centers, and Squadron Operations Centers that need support and training in Google Earth, SIRIS, and other geospatial information & services (GI&S) tools and applications. The above facts combine to make MPSC highly relevant to the IITA WEdge BPA. At a contract value of $439M, it demonstrates substantial magnitude, complexity, and scope.

Performance Category 1: Geospatial Services

Our performance on MPSC provides over 10 years of experience in maintaining and managing Geospatial data and services for our world-wide client base. Our system support representatives (SSRs) have been ***responsible for ensuring that aircrews have all map data and aeronautical information*** they needed for missions that ranged from routine training flights to precision strike missions on politically sensitive targets. In all cases, the geospatial data needed to be accurate and current—and we delivered.

As Geospatial data and delivery methods changed during the 10 year term of MPSC, we kept pace with technology. Starting with a system that relied solely on map delivery via compact disc, we evolved as well, and we provide geospatial services via DVDs, data downloads via the web, and by maintaining the Geospatial Product Library (GPL)—a set of distributed servers hosting National Geospatial-Intelligence Agency (NGA) data that provide terabytes of readily available geospatial data for aircrews at bases all over the world.

Most recently, we added ***Google Earth data*** to our skill set. We have SSRs supporting unmanned aerial systems who are trained to maintain Google Earth data servers on secure networks—systems that cannot be connected to the outside world for additional data and updates—and must be maintained locally. Not all geospatial data work “off the shelf” in our mission planning systems. Our SSRs have extensive experience in matching the raw data to the particular format of the specific planning system, such as PFPS, JMPS, Mission Planning System (MPS), as needed.

Our MPSC personnel have also excelled at tailoring the extensive amount of geospatial data to match end user-specific needs. Any given Air Force user community only uses a small subset of the tremendous amount of available geospatial data. Our SSRs work with users to ensure they have the data they need for safe and successful mission execution, but cull out extraneous data that would otherwise unnecessarily consume storage space and slow down systems.

Performance Category 2: Software Development and Research

Our personnel perform ***software development on the Mission Planning Central (MPC) portal***, the world-wide, central repository for all software and data relevant to mission planning systems. In

addition to covering software development and maintenance, this is also relevant to the requirement for an integrated digital environment for program documents and contract information.

We perform MPC development and maintenance activities following an explicit systems engineering approach embodied in the development and sustainment processes used by MPC. MPC software components are developed and maintained for both horizontal and vertical application usage. MPC horizontal capabilities development allows for expandability/scalability and incremental enhancements to components while maintaining backward compatibility for current systems. Leveraging the horizontal capabilities, vertical solutions such as an Enterprise Deficiency Tracking tool, Enterprise Action Item Tracker, and an Enterprise Peer Review tool increase the effectiveness of data sharing and collaboration through the Enterprise. Utilizing leading systems engineering indicators such as requirements volatility, verification and validation, risk handling trends, and process compliance trends, we monitor the condition of MPC systems to prevent incidents and as guidance for process improvement.

Performance Category 3: Software Maintenance and Modification

Software modifications and minor enhancements are released through test and integration environments and finally released into production. Because MPC is a web-based application, changes to the production environment are immediately available to the end users. Mission Planning Enterprise Software is hosted in a software repository for development code on MPC. When developers release new versions or patches, they are immediately available to authorized users for download, test, and evaluation. Test, development, and production FPM modules are also distributed through MPC to authorized personnel. In partnership with NGA, and for the convenience of our end users, ***MPC hosts updates to time-sensitive geospatial data such as the Digital Aeronautical Flight Information File (DAFIF), Electronic Chart Update Manual (ECHUM), and monthly updates to map products***.

In addition, the MPC enclave, which our personnel support, also hosts the USAF's WEdge central server. This server provides a Tier 1 node for the entire WEdge network and is responsible for providing data exchange, software updates, and synchronization of WEdge servers and clients throughout the country.

Performance Category 4: Information Technology Support

MPSC is the ***support contract for USAF mission planning systems across the globe***, and our personnel have an extensive and highly successful track record providing IT support for mission planning systems. Our core tasks include software installation and system set-up, joining systems to the Air Force domain, managing user accounts and privileges, and managing and configuring peripherals (printers, networked data storage, aircraft specific data transfer devices). Critical to this is disciplined configuration management using USAF processes such as MPE letters, Computer Product Identification Numbers (CPINs), and technical orders to ensure all mission planning systems are set up to tested and certified configurations. During the life cycle of the mission planning software, our technicians provide continuing IT support in the form of system patches/updates, installation of TCNOs, Group Policy Object (GPO) creation and management, and problem solving as the centralized USAF help desk providers for mission planning systems.

Management

We have been highly successful in managing MPSC due to our proven business management processes. Our ability to do this flawlessly is reflected in our superb CPARs and award fees and is indicative of our ability to manage large amounts of work. Our organizational structure for MPSC is similar to all of our other large, geographically-dispersed contracts. We employed an on-site PM at Hill AFB co-located with the customer PM. Our PM is granted complete authority to operate the MPSC contract in a manner necessary to provide sustained superior performance. At the same time, he has the ability to reach back via a direct management chain to anywhere within Jacobs for support. A significant and ongoing challenge on MPSC has always been managing a diverse, highly qualified, and geographically dispersed workforce. ***The MPSC workforce operates in over 150 locations worldwide***. Many of these have stringent and unique Status of Forces Requirements. We had to not only employ

effective technology, but also to use elegant and evolving processes to staff, train, and maintain this force in a manner that has consistently exceeded Government requirements and expectations. Using a combination of a highly effective management portal to ensure worldwide information management and systematic staffing, recruiting, and administrative processes, our performance meeting this enormous and unique challenge has been superb. ***These issues are analogous to those envisioned for the IITA WEdge BPA and our solutions to them ensure success and low risk in execution***.

Because MPSC includes more than 20 delivery orders and more than 240 direct support personnel deployed worldwide, a highly efficient and effective knowledge management tool is essential to operate the organization. We use our ***TYBRIN Enterprise Information Management System (TEIMS) SharePoint® portal*** to facilitate every aspect of MPSC management. TEIMS is an essential part of our management organization. When we initially came on contract, a coherent process for fielding and support of mission planning products did not exist. Using our OSSP, a defined, repeatable, and configuration managed process for fielding new mission planning releases was created. This process allowed customer and contractor insight into fielding status for each new product or release and improved support to the end user through enhanced management insight and control. Over the last 10 years, this continually enhanced process has ***supported the fielding and maintenance for 5,600+ mission planning systems for the USAF, Army, Special Operations Forces (SOF), and Foreign Military Sales (FMS) at hundreds of locations worldwide***. The process has allowed every fielding event to be tracked and scheduled to take advantage of synergies with fielding teams and technicians resulting in increased efficiency and reduced fielding times.

2.5 Aviation and Missile Command (AMCOM) Express - Portable Flight Planning System (PFPS)

Contractor Name:	Jacobs/TYBRIN		
Contract Number:	4600005749/101521.0020.PF (Task Order #0021)		
Contract Title/Location:	Aviation and Missile Command (AMCOM) Express - Portable Flight Planning System (PFPS)		
Date of Award and Completion (PoP):	04/01/2005 – 04/30/2014		
Contract Type	BPA	**Dollar Value at Award**	Ceiling $3M/Funded $379,604.42
Dollar Value with any Modifications	Ceiling $5M/Funded $3,513,235.97		
POC Name/Title:	Mark Hundscheid/ Project Lead, Aviation Mission Planning System		
Address	RDMR-BAO, Building 6263/AMPS, 6263 Hackberry Road, Redstone Arsenal, AL 35898		
Phone Number:	(256) 842-2277		
E-Mail Address	Mark.Hundscheid@us.army.mil		
POC Name/Title:	James M. Green/ PFPS/XPlan Development Manager		
Address	SED Mission Planning, Building 4471 Morris Rd., Redstone Arsenal, AL 35898		
Phone Number:	(256) 971-6748		
E-Mail Address	jim.m.green@us.army.mil		

Description of Project

The AMCOM Express contract is a ***multiple award BPA program*** leveraging GSA schedules to provide comprehensive advisory and assistance services (A&AS) to the AMCOM Life Cycle Management Command, U.S. Army Program Executive Offices (PEOs), U.S. Army Materiel Command (AMC), U.S. Army Research, Development and Engineering Command (RDECOM), and other customers. Technical domains include Aeromechanics Technology; Airworthiness Qualification/Release; Electronics/Avionics/Visionics/Survivability Equipment; Environmental/Safety Initiatives; Guidance Technology - Guidance Analyses; Guidance Technology - Weapon System Computers; Guidance Technology - Weapon System Guidance Industrial Operations; Infrared (IR); Image and Seismic, Acoustic, Magnetic and Signal Processing; Manpower and Personnel Technical

Support; Manufacturing Science and Technology; Navigation and Control; Optics and Laser; Product Assurance Production Engineering; Propulsion Systems/Technology; Radio Frequency (RF) Technology; Systems Engineering; Structures and Materials; Systems Modeling and Simulation; Software Engineering; Technical Data Management; Test and Evaluation; Automated Test Equipment(ATE)/Test Program Set (TPS) Warheads; and Weapons Science.

We performed a variety of mission planning software engineering projects on the AMCOM Express contract. Most of these projects are highly relevant to the technical disciplines and activities necessary to provide geospatial engineering services. One task in particular, the PFPS v5.0 Phase 1 task order, entailed the development of a prototype and full detailed design for a follow-on mission planning system to PFPS v4.X. The system, called PFPS v5.0, was later renamed XPlan. As the task order requirements stated: "The basic components of PFPS are being redesigned and rewritten to allow for future growth and to utilize the tools available in the new development environments." Our work on the task order delivered the foundational elements to do just this: using a slightly altered version of the Agile process template provided by Microsoft® (heavily influenced by Scrum), we provided software design/prototypes and follow-on project plans based in TFS.

Performance Category 1: Geospatial Services

A key part of the work included ***leveraging Google-based visualization of mission planning data*** (notably PFPS route of flight data) to demonstrate the flexibility of the architecture we were proposing be used in PFPS v5.0/XPlan. This value-added segment of the work on this project included the façade-based connection to the PFPS v4.X RouteServer that enabled viewing and editing of PFPS v4.X-based routes using a completely different "front end." The work involved web-based Silverlight presentation and editing of mission planning domain objects (notably the route of flight) via browser-based presentation linked, via AJAX mechanisms, to server-side, C#-based façade code that connected to the PFPS v4.X RouteServer/architecture. A map server was created to provide map and chart overlays in various increments of resolution depending on the view the user selected from the user interface (UI). This map server ***ingests NGA maps and charts*** on the fly, alters them for the view requested, and caches the map segments for future requests to minimize processing overhead. For weather information, a connection was made to weather services, also developed by our personnel for another effort, to display weather over the selected planning area in the viewer using icons familiar to the mission planning user.

Performance Category 2: Software Development and Research

Our seven-month development for PFPS v5.0 Phase 1 was based on using TFS and a Scrum-based lifecycle model with two-week development iterations. The approximately 12-member team included a single program manager, a dedicated CM professional for versioning/builds/continuous integration, and two dedicated SMEs (ex-aviator PFPS users/testers). The work included the ***full use of TFS, including project planning and execution, CM, code/peer reviews, and utilization of all Agile process template work items and TFS-based dashboards, project portals, and reporting*** (with monthly financial reports, etc.). Unit tests were required for all non-UI code modules with a goal of 80% code coverage.

The work was primarily .NET framework-based design and implementation using a very strict Model-View-View-Model (MVVM) architecture. We used build automation in TFS, "slaving" code check-ins with automatic execution of unit-level test suites (continuous integration). Our team rigorously held to a disciplined solution architecture that properly isolated and interfaced presentation, domain objects/behavior, and persistence. We used C# for all development and exploited Windows Presentation Framework (WPF), which facilitated a very loosely coupled Extensible Application Markup Language (XAML)-based presentation layer. Comprehensive design documentation and extensive automated unit testing/code coverage and analysis were part of each iteration's content/work products.

Performance Category 3: Software Maintenance and Modification

Although the PFPS 5.0 project represented new development, this activity required significant research and analysis of existing code and capabilities in the PFPS Route Server, FalconView, and earlier

versions of PFPS to comprehend system functions and develop interfaces in to these systems. Both the Route Server and FalconView present Component Object Model (COM) interfaces. Incorporation of the COM objects in the PFPS 5.0 solution required the creation of custom InterOp assemblies to encapsulate the unmanaged code provided by the Route Server and FalconView COM objects in a .NET Common Language Runtime (CLR) managed wrapper. Unlike fully managed CLR code, unmanaged code presented by an external interface does not come under the control of the .NET Garbage Collection system, which is responsible for release of computing resources and memory management. This unmanaged code may in turn call many other resources, which themselves are not managed by the CLR runtime, such as file Input/Output and database management systems. We were required to develop a careful understanding of how these external, unmanaged resources were involved and invoked through the COM interfaces. Failure to properly release and clean up these unmanaged resources would lead to memory leaks and runaway processes that would render the system unstable and lead to significant performance bottlenecks. We carefully studied and designed the interfaces into these external resources, as well the internal functioning of those resources, to fully understand their operations and guide us in our design decisions on how to integrate them in to PFPS 5.0.

Performance Category 4: Information Technology Support

N/A

Management

At the start of the project we developed a project plan outlining the intent of the project and the processes to be used. Reports and metrics were accumulated and some were provided by our TFS system during development of the PFPS 5.0 prototype. These metrics included a view of the state of the project in terms of hours burned vs. planned, task items open, task items closed, requirements open, and requirements closed among others. An Integrated Digital Environment (IDE) was available via our Microsoft® SharePoint® portal external customer view, but was not used by the customer on this effort. Project management reviews were conducted at regular intervals during development to provide insight to the customer on the health of the project to include cost, schedule, technical, and risk status.